The Chemical Age

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NOTICES:—All communications relating to editorial matters should be addressed to the Editor. Other communications relating to advertisements or general matters should be addressed to the Manager.

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British Scientific Products

ON another page we give some impressions of the exhibition now being held at the Central Hall, Westminster, under the auspices of the British Science Guild. During the coming reconstruction period, advertisement of this kind is clearly necessary to enable manufacturers to recover from the effect of restricted opportunities of keeping in touch with their customers at home and abroad. Advertising during the war has been rather stereotyped and somewhat ineffectual because it was devoted to the special needs of the times rather than to normal trade requirements. Considerable credit is due to the British Science Guild for its courage and foresight in appreciating the value and necessity of anticipating the demand, and creating an organisation for the larger and more representative exhibitions of the future. It was not possible during the war to devote the time or material to the staging of exhibits worthy of war achievements and peace programmes, and the fact that the applications for space on this occasion largely exceeded the supply is of happy augury for the future.

It is to be hoped that at the next exhibition, much larger premises will be available, and that the section on chemistry will be suitably subdivided. A representative section for chemical plant and machinery would, we feel sure, fill a large hall by itself, and should be kept separate from exhibits of chemical products and those relating to pure chemistry, medicinal products, and laboratory appliances. The principle of asking for donations toward the expenses instead of making a definite charge for exhibition space has been criticised in many quarters. An exhibition should be run on strictly commercial lines, and no firm or individual should be able to secure space at the expense of others. The preparation of really good exhibits, together with freight and erection charges, attendants' time, and the like, entails fairly heavy expenses, and when deciding upon the extent of their effort exhibitors prefer to know its total cost fairly accurately beforehand and to make an appropriation accordingly. The experience gained in these preliminary ventures will be of great value and by enlisting the co-operation of other societies we feel sure that the British Science Guild will be able to broaden the scope and interest of future exhibitions and to reap the full benefit of its patriotic endeavours.

Sir A. Steel-Maitland's Resignation

THE resignation of Sir Arthur Steel-Maitland, M.P., of the recently created office of Head of the Department of Overseas Trade, is distinctly disquieting, at a time when all the resources of the nation should be mobilised in the interest of British trade development. It is especially disquieting because it is plainly, from the terms of his letter to Mr. Bonar Law, the result of inter-departmental feuds between the Foreign Office and the Board of Trade, which seem to be concerned much more about resisting supposed encroachments on their respective preserves than in co-operating together for the good of British trade. The Department of Overseas Trade is a development of the old Commercial Intelligence Branch of the Board of Trade, and it was hoped that with Sir A. Steel-Maitland at its head, holding the posts of additional Under-Secretary for Foreign Affairs and additional Under-Secretary to the Board of Trade, the commercial policy of both departments might be co-ordinated. Sir Arthur himself was conscious at the time of the delicacy of his *liaison* duties between the highly sensitive officials of the respective departments. He realised how when the Board of Trade saw in some point a purely commercial problem, the Foreign Office as clearly saw in it a political problem, and while the tug-of-war went on between the rival officials there was a good chance of some foreign competitor chipping in and getting the business. There is a tinge of proper bitterness and disappointment in Sir Arthur's letter, for he had set himself earnestly to bring our public services to the aid of the British trader. "I do not know," he writes, "whether the Government is really in earnest as regards re-establishing our international trade (which I

myself consider vital), but at least, so far as I am concerned, I cannot continue to take the responsibility for work under such conditions that I cannot develop it or, indeed, carry it on properly, and when I am constantly hung up as, for example, with the Consular and kindred services." It is not pleasant to hear from so high an authority of our trade being "hung up" when the solvency of the Empire depends upon its vigorous expansion, and it is to be hoped the obstructionists will be appropriately dealt with.

The Right Man for the Job

We are a conservative nation, and as individuals we possess in full degree the inherent predilection for dropping into stereotyped habits and conventional grooves. It has taken a colossal war to impress upon us the fact that conservatism, particularly in science and industry, if carried to excess, simply means stagnation, and though we have undoubtedly profited from the experience of the past four-and-a-half years, there is danger even yet that we may fall back into our old habits and neglect to profit by the lessons of the war. Most particularly is it necessary to bear in mind that, although the last few years have been productive of an immense amount of research from which our peace-time industries must benefit, there must be no slackening of the pace in this direction if we are to maintain and extend our position in the industrial world. During the war much of the technical research has been carried out at the national expense, but now that this temporary endowment is being curtailed the time has arrived for our industrial magnates themselves to foot the bill, and to foot it handsomely. In the current issue of the *Electrician*, a research chemist, finding his services unvalued in his native country, tells how he drifted, with many others, to Germany, for the simple reason that the heads of the large firms there realised the commercial value of the trained scientific mind. Accordingly, to the chagrin of this group of Englishmen, the help they had given to German industry eventually turned against their own country. Their reward was internment and ill-treatment in Ruhleben, and now that they are free they pertinently ask whether the "will to research" is even yet fully alive in England.

It is not sufficient for a captain of industry merely to decide to institute a research department in connection with his business. The value of such a department depends entirely upon getting a man to run it who is gifted with the right psychology, and such a man is born rather than made. He must possess the creative gift, the faculty for seeing new combinations and possibilities where the most accomplished technician without such a gift sees only the bald facts. He retains, moreover, such an incurable interest in experimenting that he is quite willing to sacrifice the joys and emoluments—and, incidentally, the petty worries —of managerial power in order that he may pursue those inclinations which become a pastime as well as a livelihood. Many such a man, once he is found, would be worth his weight in gold to a firm who would tempt him with salary and prospects of royalties to stay and devote his time to mastering thoroughly one branch of technical work, and to get to the forefront in that branch. And, with all our talk of the dull but plodding nature of the German, we find in reality that it is merely such uncreative beings who are placed at the disposal of a research genius who presides over them. After all, the man with the constructive mind can be better employed than standing over apparatus waiting to see the result of long and tedious tests. He can be better employed while the manual labour is being carried out for him by those who are unfitted for mapping out the course into the unknown, but who can readily tread such a course once it is prescribed for them. The mistake which we are likely to fall into in this country lies in our general inability to differentiate between the creative mind and the ordinary executive or mechanical mind. If research departments are to be organised it is a question of choosing the right man for the job, and, having found him, to supply him with a staff who can carry on the ordinary "spade" work. If in the past we have had our disappointments in research, and as a consequence its value has been scoffed at and impaired, we must primarily blame ourselves for our inability to appreciate the type of mind which is essential to success.

The Role of the Pure Scientist

In order to secure stability and permanence to our newly formed chemical industries it must be borne in mind that the pure scientist and the research chemist have each their definite parts to play in the industrial machine. We shall hope to find, therefore, that all the larger industries—and the majority of these are to some extent dependent upon chemistry—will have a research staff at work on their special problems. The smaller and more specialised undertakings should be able to take advantage of mutual co-operation in research, either with or without State assistance. This phase of industrial activity is now well defined both in the United States and in England, and is likely to result in an immediate and serious depletion of the staffs of the universities and technical schools. The younger members of academic staffs, who normally enter upon their career full of enthusiasm for pure scientific work, are finding that technical work offers much greater opportunities for valuable and interesting research, with adequate remuneration attached; while the academic appointment is chiefly noted for the extraordinarily low salary attached to it and the long hours occupied in teaching—two factors which militate against original work.

Chemical industry as a whole should start to look ahead and make ample provision for ensuring a continuous supply of research chemists, trained not merely in chemistry but in research methods. It is essential that universities should not become purely centres of scientific education, for scientific data can usually be obtained from the multitude of present-day publications, but they should become centres of research in conjunction, if necessary, with their purely educational functions. What is required at the present time is the correctly-trained individual who can translate "test-tube" experiments to industrial practice. Germany in the past has been exceedingly fortunate in possessing a great number of chemical engineers, who, being both chemists and engineers, are not merely happy optimists, and this has permitted her to place on an industrial footing processes such as contact sulphuric

acid plant, synthetic ammonia, and nitric acid, not one of which processes originated in that country. It is to be hoped, therefore, that in the near future we shall be equipped with sufficient skill and daring to conduct our own inventions through the various semi-technical stages until they become recognised commercial propositions.

Rubber Research in America

THE organisation of a Rubber Chemistry Division of the American Chemical Society has been received with favour throughout the United States chemical industry, and important results are expected from it, as affecting both the rubber industry and the larger interest of the progress of scientific knowledge and application. The problems there are very much what they are in this country, and, judging from the comments of *Chemical and Metallurgical Engineering*, there is the same need of two conditions—(1) the more liberal employment of chemists in industry and (2) the pooling, rather than the insulation, of scientific results in the public interest.

"The chemical industry," our contemporary states, "has thriven in this country, and it has produced vast wealth, but this has been the result of circumstance rather than because of wisdom and vision within the manufacturing organisations. Some manufacturers have always been progressive, but not all of them, by any means. Most of them employed chemists because they had to, and if these men could get time off to visit meetings of scientific and technical associations they were usually under instructions to sit still and say nothing, but to bring back whatever they could learn of their competitors' methods and practices. That is supposed in some quarters to be the very peak of diplomacy and astuteness. When a man of high authority in a manufacturing corporation conceives a thought of that nature his chest swells, and all his little admirers call him a wonder and declare that nobody can beat him! But in the brotherhood of American chemical industries rubber has been scientifically backward, and this is not the fault of the chemists. There has been a lack of men of scientific training on the boards of directors, and, as we have said before and expect to say again, it requires more than business acumen to see the light of science.

"It is high time for the rubber industry to dig into the philosophy of rubber chemistry. The Division provides a start. We shall have now to meet the question whether the authorities will see clearly enough beyond the walls of their works to understand that the way to get ahead is to work together, to permit and encourage chemists to work at research, and to make known their findings. We doubt if there is a single establishment far enough ahead to meet real, intensive research if the manufacturers of some other country should awaken to its value. In this connection we are always fond of recalling a statement of Dr. James Douglas in one of his 'Non-Technical Essays on Technical Subjects,' to the effect that those who close the door against the release of information simultaneously raise an equally effective barrier against any knowledge filtering in. The rubber industry of to-day can learn a profitable lesson from a comparison of present conditions in the iron and steel industry with those of the good old days before the spread of technical knowledge."

Our Growing Exports

IT is satisfactory to find from the trade returns for the past month the substantial increase in our exports and especially in re-exports. The following table shows the value of imports and exports for the month and for the six months ended June, together with the increases as compared with the corresponding periods of 1918:—

JUNE, 1919.

Imports.....	£122,945,655 ..	+£21,400,936 ..	+ 21.0%
Exports.....	£64,562,346 ..	+£19,536,115 ..	+ 43.3%
Re-exports ..	£11,964,079 ..	+ £9,849,302 ..	+465.7%

SIX MONTHS ENDED JUNE, 1919.

Imports.....	£717,034,479 ..	+£64,792,581 ..	+ 9.9%
Exports.....	£334,755,257..	+£87,922,608 ..	+ 31.5%
Re-exports ..	£55,435,170 ..	+£38,657,009 ..	+230.4%

The following are among the details of imports of foreign and colonial merchandise:—

	Value.		Inc. or dec. per cent. compared with June, 1918	
	1918.	1919.	Quantity.	Value.
Copper, ore and regulus	227,124	31,055	79.2	—86.3
Hides, dry and wet	1,247,080	1,106,951	—10.9	—11.2
Iron and steel	476,460	861,760	+63.1	+80.8
Leather	633,106	2,698,008	+456.8	+.326.1
Oil petroleum	5,083,315	3,202,431	—30.8	—37.0
Rubber	534,565	2,180,727	+401.4	+307.9
Sugar, refined	26,083	2,102,525	+8,976.5	+7,960.9
Sugar, raw	2,148,150	4,115,645	+81.1	+91.5
Tallow & stearine..	55,301	656,031	+1,624.9	+1,086.2
Tin.....	452,643	346,459	+11.3	—23.4

The exports (produce and manufactures of the United Kingdom) contain the following items:—

	Value.		Inc. or dec. per cent. compared with June, 1918.	
	1918.	1919.	Quantity.	Value.
Cement	24,034	197,545	+472.0	+721.9
Chinaware and earthenware	310,061	261,359	..	15.7
Coal, coke, &c. ..	3,623,598	7,516,130	+36.7	+107.4
Copper, all kinds .	135,518	307,266	+153.1	+126.7
Iron and steel ..	3,310,404	5,280,217	+26.0	+59.5
Machinery and millwork	1,571,980	2,534,744	..	+61.2
Manures, chemical	25,363	169,648	+293.8	+568.8
Oils, seed	44,968	1,230,030	+3,079.0	+2,635.3
Salt (except table salt)	99,211	83,565	—35.1	—15.7
Soda compounds ..	268,023	249,216	—0.2	—7.0
Spirits	279,236	330,052	+11.6	+18.1
Sugar, refined.....	2,611	3,475	+63.0	+33.0

A Seven Hours Day

WITHIN certain limits there is a good deal in Lord Leverhulme's plea that short hours may be accompanied by increased production, but we are not quite prepared to accept it as an axiom that the less a man works the more he produces—which is really what some people appear to think. The shortening of hours, in so far as it avoids fatigue and ensures reasonable opportunities for leisure and recreation, is wholly to be welcomed, and the tendency is certainly strongly in that direction. It is illustrated in the Bill to give effect to the recommendations of the first interim Sankey report on the hours of work for miners.

The Recovery of Cyanides from Coal

The writer of the following article has had considerable experience in the recovery of cyanides, and describes the modern simple process which permits of the ready extraction of the hydrocyanic acid resulting from the distillation of coal. The process was of some importance during the war, in that it was at one time proposed to utilise cyanide compounds for the manufacture of poison gas. It would seem, too, that there is some considerable prospect of more general removal of hydrocyanic acid from coal gas in the future, in that it is becoming to be regarded as a not altogether desirable constituent owing to its corrosive action. It may be noted that although the German output of cyanides is probably double that of our own the whole of the more effective processes were thought out in this country.

It is a remarkable fact that the Germans, by their introduction of the more diabolical methods of conducting modern warfare, have, in many instances, merely elaborated the processes of torture which were applied in less enlightened ages. For instance, Professor Henry Louis has mentioned the first uses of chlorine as a means for torturing criminals; and, to go back still further, we find that upwards of four thousand years ago the ancient Egyptians utilised hydrocyanic acid for putting people to death. Evidently the secret of this poison was then passed on to the Romans, for it is said that hydrocyanic acid was actually called into use by Nero when he considered it expedient to rid himself of his brother Britannicus. In those days the acid was extracted from crushed peach stones and leaves by a simple process of distillation, but although it exists in small quantities in plants and natural oils it is to coal that we now look for our chief supplies. Cyanogen compounds were in demand at one period of the war as a means for producing poison gas, and owing to the normal output being considerably short of the quantity required additional plants for the recovery of the product were put in operation. Eventually, however, other constituents for poison gas were preferred.

As in many other instances, the resources of coal were turned to account, and the hydrocyanic acid was recovered from ordinary coal gas by interposing a vessel containing a medium capable of absorbing the acid, but which had no effect on the remainder of the constituents. The cyanogen in coal gas is almost wholly present as hydrocyanic acid, although there is some indication that it also occurs in small quantities as free cyanogen and ammonium cyanide. It is produced by the combination of hydrogen, carbon, and nitrogen in the retort, a combination which takes place fairly rapidly at high temperatures, and particularly at those temperatures at which ammonia is decomposed, the elements recombining with the addition of the carbon atom to give HCN. The most favourable temperature for the formation of hydrocyanic acid is, in fact, about 1,100 degrees C., and the maximum quantity obtained from a ton of English coal is about 1½ lb. or 10,000 grains.

Methods of Recovery

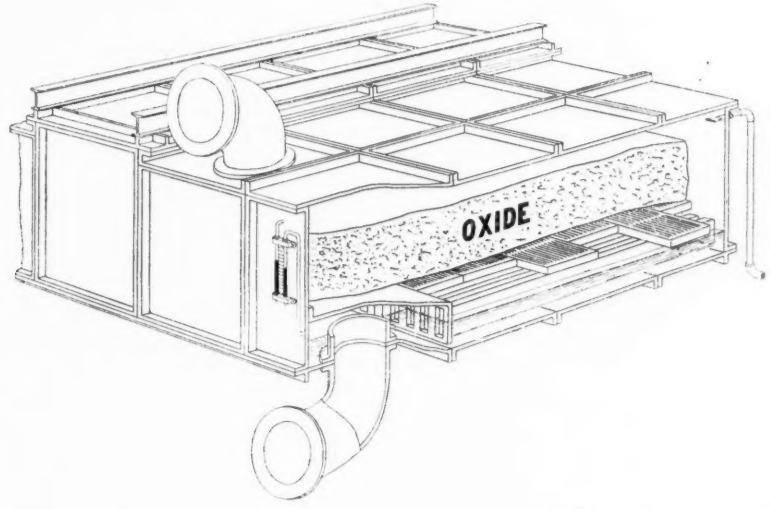
The methods of recovering cyanide products from coal gas differ considerably in this country and on the Continent. In Germany chief attention has been given to recovering the Prussian blue formed in the oxide of iron (used for purification of the gas from sulphuretted hydrogen), which under favourable conditions will absorb 80 to 90 per cent. of the total hydrocyanic acid present. Such methods, however, are decidedly unwieldy, and frequently involve the prior extraction of the free sulphur in the oxide, this being washed out by some convenient solvent such as carbon bisulphide. Lately, however, improved methods have been introduced which obviate the prior removal of the sulphur, and consist, in the main, of the lixiviation of the spent oxide for the removal of the soluble salts, such as ammonia and the sulphocyanide. The insoluble salts then undergo treatment for conversion into soluble compounds, and finally the whole of the cyanogen is recovered as potassium ferrocyanide. Lixiviation is carried out in tanks in whch, by any suitable arrangement, the oxide is thoroughly washed with water. The liquor thus obtained is treated with lime for the recovery of ammonia, a certain amount of calcium sulphocyanide being formed by the action of the lime. The next stage is the recovery of the insoluble ferrocyanides by treating them with lime or other alkali. The material is led, together with the dilute liquid obtained in the first stage of the process, into a boiler, and the mass is heated with steam and thoroughly intermixed by means of the stirring apparatus. The sludge obtained is then caused to flow to a filter-press in which the cyanide solution is separated. The cakes from the press are afterwards thoroughly pulverised and sifted, mixed with lime, and finally treated again in a stirring tank. The resultant liquor contains chiefly calcium ferrocyanide and some calcium sulphocyanide. The next step is to precipitate the ferrocyanides from the solution. This may be carried out in several ways, such as by means of iron, ammonia, or potassium salts. If ammonia is used the cyanide solution is treated with hydrochloric acid, in which case a double salt, calcium-ammonium ferrocyanide, is obtained. This double salt is then mixed with a further quantity of lime, when a pure calcium ferrocyanide is obtained, this latter being eventually converted into potassium ferrocyanide.

Extraction from Coal Gas

Contrary to the Continental practice, the chief processes of cyanide recovery as employed in this country are those by means of which the hydrochloric acid is arrested before reaching the oxide of iron purifiers, and the whole operation is considerably simplified in this way. The hydrocyanic acid, according to the method employed, is recovered as either ammonium sulphocyanide or prussiate of soda. Ultimately, the sulphocyanide or prussiate is converted into sodium cyanide (mainly for gold recovery processes), and so far as the operation of conversion is concerned the prussiate is to be preferred. For all this, however, the sulphocyanide method is strongly to be recommended in that the process as now modified possesses such peculiar simplicity of working that, once started up, it may be said to look after itself, and requires no constant attention or labour. While speaking of the presence of hydrocyanic acid in coal gas it is interesting to recall that in the recent discussions which have centred round the provision of a standard town's gas recommendations have been put forward that cyanogen should be extracted as far as possible. In this respect it may be said that although the smallest of gasworks could readily instal the simple apparatus necessary for removal it must be remembered that under peace conditions there is only a limited demand for cyanides, so that universal extraction might well be followed by flooding of the market. There is, however, a possible solution to such a contingency, for attempts have been made to convert cyanides into ammonia for which, of course, there is an unlimited demand; and, although work on the problem was more or less held up by the war, there can be no question that the promise of success in this direction is considerable. One such process consists in treating the compound recovered from the gas (in the form of sulphocyanide) with an excess of sulphuric acid at a definite temperature, when ammonia, carbon oxysulphide, and sulphate of ammonia result.

The Polysulphide Method

The polysulphide process is dependent upon the fact that whereas hydrocyanic acid will combine with ammonium polysulphide, it will not enter into combination with the simple sulphide. Accordingly, the methods consist primarily of the self-preparation of a polysulphide solution. The ammonia in ordinary gas liquor is largely present as the simple sulphide, and in the early attempts this sulphide was converted into the polysulphide by the addition of powdered sulphur to the liquor. The original process of the British Cyanides Company was operated on this principle, but in the new polysulphide process, the invention of Mr. P. E. Williams, the necessity for introducing a special supply of free sulphur is obviated by making use of the sulphur present in the spent iron oxide resulting from coal gas purification. A diagrammatic sketch of the apparatus is shown in the accompanying illustration. From this it will be seen that the vessel employed resembles an ordinary dry purifier, access to which is obtained through portions of the top which are made removable. The inlet gas entering at the base of the vessel passes in the first instance through a tar extractor operated on the bubbling principle, the gas passing through the cyanide liquor which forms the seal.



Above the tar extractor is arranged, on suitable brackets, a tier of wooden grids which support a layer of spent oxide, evenly spread over the whole cross-section of the vessel, and about twenty-four inches in depth. The spent oxide used should preferably be of good quality, containing not less than 50 per cent. of sulphur. It is kept in a moist condition by a simple arrangement of sprays fitted around the four sides of the vessel at a point well above the oxide level. A short period of spraying every day with water or a weak cyanide liquor is all that is necessary. In this way the polysulphide solution is formed within the interstices of the oxide bed, and is immediately converted into ammonium sulphocyanide by the incoming gas. The cyanide liquor, after trickling through the oxide mass, drops to the base of the vessel, from which it overflows to the storage tank by way of a seal. With regard to the formation of the sulphocyanide a straightforward reaction on the following lines takes place—

$$(NH_4)_2S_2 + HCN = NH_4SCN + NH_4SH$$

Probably the most surprising feature of the process lies in the fact that although sulphur is inevitably required for the completion of the reaction, the spent oxide, after working for some period, shows no loss in sulphur content, and occasionally some increase is found. Thus, there must occur a simultaneous absorption from the coal gas of ammonia, sulphuretted hydrogen, and oxygen, the oxide taking up sulphuretted hydrogen which is eventually oxidised to sulphur, providing in this way a continuous supply of free sulphur. The process would, in fact, be continuous but that the physical condition of the spent oxide necessitates its periodical removal from the vessel and the substitution of a fresh layer. Recent installations, in which low space-velocity ratio has been provided for indicate that the extraction vessels will last for a period of so long as two years before the physical condition of the oxide necessitates renewal. Thus, the plant may be run for this period with practically no expenditure on labour.

Working Figures

Figures obtained as a result of careful testing have shown that from the point of view of coal gas manufacture alone the process possesses the merit of lightening the work of the ordinary purification apparatus in that it removes other constituents in addition to the hydrocyanic acid. For instance, of the ammonia contained in the crude gas entering the cyanide-extraction plant about 25 per cent. is removed. The sulphuretted hydrogen also shows a reduction of 25 per cent., while carbon dioxide falls off by from 5 to 12 per cent. It is essential to remember that there must be a small proportion of oxygen in the inlet gas. In general this proportion varies between 0.2 to 0.6 per cent., and—by oxidising the iron sulphides in the oxide mass—gives rise to the free sulphur which is vital to the working of the process. As regards efficiency, it has been found that the latest plants are capable of removing from 95 to 98 per cent. of the total hydrocyanic acid in the gas. The ammonium sulphocyanide liquor flowing away from the base of the plant varies in strength from 2.5 to 3 lb. of ammonium sulphocyanide per gallon, and the more common method is to distil this liquor with lime, drive off the ammonia which is converted into sulphate of ammonia, and then to concentrate the remaining liquor, which is now in the form of calcium sulphocyanide. In some of the recent plants, however, the ammonium sulphocyanide has been treated direct with soda ash, in which case the product obtained is sodium sulphocyanide, having a strength of about 4 lb. of the latter compound per gallon of liquor. So far as the gas undertakings are concerned the process generally ends at this

stage, the sulphocyanide being sold to recognised firms which undertake its conversion into sodium cyanide.

American Methods

The latest addition to the list of cyanide extraction processes is the modification of the German Bueb method which has recently been introduced in America under the title of the Bartlett Hayward system. In this process the crude coal gas is washed with a 25 to 30 per cent. solution of ferrous sulphate, which, together with the ammonia and sulphuretted hydrogen in the gas, constitutes the medium for absorbing the hydrocyanic acid. The average efficiency of extraction amounts to rather more than 95 per cent. The various stages of the process are too involved to receive detailed mention here, but in the first instance ammonium ferrous-ferro-cyanide is formed, and the final products obtained consist of insoluble double ferrocyanide of ammonia and iron, with a solution of sulphate of ammonia. It is said that the average yield of the process per ton of coal carbonised is approximately 1.6 lb. of cyanide, and 2.66 lb. of sulphate of ammonia.

In conclusion, it may be mentioned that in pre-war days Germany paid far more attention to the recovery of cyanogen than we did in this country. Comparative figures have shown that the German gasworks alone produced various cyanide products equivalent to over 10,000 lb. of yellow prussiate per annum, whereas in this country the output has not exceeded 5,000 tons. With cyanide extraction generally adopted our potential output would be in the neighbourhood of 24,000 tons of the yellow prussiate per annum. Apart from the gasworks yield, Germany possesses an additional source in the beet molasses residue which is not available in this country, while a small quantity was also produced from atmospheric nitrogen.

Recovery of Used Lubricating Oil

To the Editor of the Chemical Age

Sir,—I have read with interest Mr. F. E. Weston's remark in his article on "Some problems in the oils and fats industries" that "no successful process had as yet been devised" for recovering from used lubricating oil a product suitable for re-use as a lubricant. Happily, however, this statement is not altogether correct, as to my personal knowledge tens of thousands of gallons of used lubricating oil have been treated by a process elaborated under the expert guidance of Lieut.-Colonel Stanley Smith, O.B.E., Assistant Controller of Salvage, War Office. All this oil, which was carefully salved and collected by the R.A.O.C., R.A.S.C., and R.A.F., has been successfully processed and returned to the Services, with highly satisfactory results. Indeed, I am informed that the "processed" oil is preferred to new issues. Its lubricating properties are fully up to the high standard demanded in Army specifications, and the single criticism I have heard is to the effect that Colonel Stanley Smith's oil leaves rather a pronounced odour, by which it can be recognised.

I have ventured to call your attention to this matter not for the purpose of contradicting so eminent and conscientious an authority as Mr. Weston, but rather for the reason that it is well the public should know that even the War Office occasionally listens to the man of science, and further, that the careful operations of the Salvage Department have resulted in saving the nation, on this item alone, several thousands of pounds.—Yours, etc.,

M. T.

London, E.C., July 3.

A fire which occurred in the resin stocks at the Midi Railway Station, Bordeaux, destroyed about 4,000 casks of resin.

A Visit to the Potash Mines of Alsace

(From a French Correspondent)

As soon as the Armistice had been signed I carried into effect my long-standing intention of re-visiting my native Alsace to see on the spot the traces that had been left of four years of war. The sufferings of the people have often been described, and I wish to deal here only with what struck me more particularly from the point of view of the possible reparation of the material damage done.

Approaching the mining district of Bollwiller, I noticed that the forest, instead of being thickly planted with trees and shrubs as formerly, was intersected in every direction by railway lines, not in single sets, but in two and three. I gathered that this ramification of lines and the hundreds of wagons concentrated at the sidings served nearly exclusively for the rapid despatch of the products of the potash mines, which, for some years past, had helped to add to the German output of this valuable fertiliser. During the war, the quota furnished by the Alsatian mines had not been very large; some say that it had been kept low deliberately, while others affirm that the French guns placed on the Hartmannswillerkopf near by commanded the railway line from Strasbourg to Mulhouse to such an extent that very few trains carrying potash, even when they were sent off in pitch dark nights and with all lights out, got far, and most of them were blown up. The latter surmise seemed the more correct one, for I was told that work in the mines themselves never stopped, and that, in consequence, there were considerable stocks of potash on hand when the French gained possession in the closing months of last year.

The inspection of the mines was a revelation: I had heard of Welsh collieries, where miners have often to crawl and remain on their knees for hours on end to gather the black diamonds. The Alsatian potash mines, on the other hand, have high and spacious galleries, where men can walk about upright and without the least discomfort. Not being cramped they can, naturally, do themselves justice, and it is no matter for surprise that the daily output per man averages at least 1½ tons of potash salts. Everything is done to encourage production, the workmen are well paid, comfortable housing accommodation is close at hand, and machinery is everywhere of the very latest pattern. The potash is raised and discharged into the wagons which run right up to the eighteen shafts in operation, and there is thus no waste of labour or material.

The distance by rail from the mines to Strasbourg is only a couple of hours, and at the port of Strasbourg the potash is transferred to Rhine lighters, which take it to Rotterdam or Amsterdam in the most economical manner. But the management of the mines is not yet satisfied with even this nearly perfect system. In order to reduce working costs and freight still further, plans have already been drawn up for the building of a canal to connect Strasbourg with the mines which will then be able to send their output by water all the way and effect considerable economies in time and rolling stock. Such reduction would be to the evident advantage of the consumer and stimulate the demand for potash, leading in its turn to increased food production and lower prices.

Through the efficient management of the mines and the staff, the output of the Alsatian potash mines is constantly growing. In 1919 it has already reached record figures and it should double itself in 1920. The administration aims at furnishing the Allies with their requirements in potash, and that aim can be attained without encroaching upon the supplies destined for the neutrals who no longer wish to be entirely dependent on the Stassfurth deposits.

The intensive exploitation of the Alsatian potash mines will be an important factor in the restoration of the economical life of France. They will make up, at least in part, for the destruction of her Northern provinces.

The British Scientific Products Exhibition

A Stepping Stone to the Revival of Trade

(From Our Special Correspondent.)

This year's exhibition at the Central Hall, Westminster, which remains open until August 5th, is in many respects a distinct improvement upon those previously held at Manchester and at King's College, London, both as regards quality and arrangement of exhibits. The descriptive catalogue is a well-arranged volume of about 350 pages, some 140 pages being devoted to a description of exhibits and the remainder consisting of well-written articles describing the war work of the universities and other institutions, and British industrial research laboratories (by A. P. M. Fleming), industrial research associations, and lists of scientific and technical books.

The chemistry section is, of course, that of paramount interest to readers of The Chemical Age, and while some of the stands in this section are already familiar, there has been a refreshing influx of new exhibitors. Many of the exhibits call for little comment, being merely a series of well-arranged samples of the firm's products without any attempt to describe the raw materials or methods of manufacture, or to illustrate by photographs or diagrams the plant used, its size or the number of operatives. They thus lose in educational value, and are little more to the public than an inferior catalogue. The exhibit of the British Cellulose and Chemical Manufacturing Co., Ltd., is an exception, and will be found very interesting, but in this and also in other cases the exhibits suffer somewhat from overcrowding or inferior position.

Pure white neutral sulphate of ammonia will evidently be in increasing demand, and its distributable properties are well illustrated by the "sulphate fountain" of the South Metropolitan Gas Company, whose stand is attractively mounted in an imitation gasholder. The Hydronyl Syndicate illustrate the same property by letting the salt run through an hour glass, but some of the samples of the latter company scarcely compare with those of the former undertaking.

Acid-resisting iron is as usual represented by Messrs. Haughtons and the Lennox Foundry Company. While there have been no startling new developments in this industry, the quality and finish of the material have improved, and it certainly requires first-class foundry practice to turn out some of the articles shown. The Lennox Foundry Company also shows samples stated to resist hydrochloric acid, and working models of vacuum ovens, ball mills, &c., together with photographs of the full-size plants.

Acid-resisting enamelled cast iron chemical plant is represented by Messrs. T. & C. Clark & Co., Ltd., and considerable progress is registered in this important work. Messrs. Guthrie & Co., of Accrington, exhibit an excellent range of plant and apparatus in ceratherm, an acid and heat-resisting material of considerable promise. Chemical engineers will do well to study this exhibit carefully from the point of view of design. Messrs. Shanks' "Vitreon" ware is another example of special grade chemical ware having useful properties. Messrs. Hedley & Co.'s exhibit of ethyl chloride should not be missed by those interested in refrigeration. In common with a few other notable firms, the United Alkali Co. is conspicuous by its absence; this is unfortunate as, among other things, the applications of duroprene attracted considerable interest at the Manchester Exhibition.

The stand of the British Dyestuffs Corporation (Levinstein and British Dyes) is certainly of educational value, and designed to illustrate the extent to which an industrial country is dependent upon the dye and colour industry. The variety of the applications of dyestuffs and the complexity of the processes and colours required to produce even a single direct cotton colour are really amazing to the uninitiated. A remarkable range of chemical products is shown by Messrs. A. Boake Roberts & Co., of Stratford. Laboratory glassware and appliances are as usual well represented and worthy of careful inspection; an interesting feature is the copper-plated glass vessels of Messrs. Gallenkamp & Co., Ltd.

In other sections the following are noteworthy:—The Damard Lacquer Co. display condensation products of phenol and formaldehyde under the name of formite (a near relative of bakelite). This material should have application in the chemical industry for varnishes, cements, packing and impregnating. Messrs. Ozonair, Ltd., as their name indicates, deal with the industrial applications of ozone. Apart from its uses for ventilation, sterilisation, medical and therapeutical uses, ozone is likely to be of increasing importance in the chemical industry, where it is already in use for many oxidation and other processes.

The two chief types of CO_2 recorders are represented by the "Sarco" (Sanders, Rehders & Co.) and "WR" Patents Limited. The latter is of the continuous reading type and is worth studying; the former is already well known. In the electrical section the Osmosis Co., Ltd., exhibit raw and purified samples of clays. These have been subjected to an electrical process, the great importance of which is not yet fully realised.

Metallurgy and particularly metallurgical engineering are subjects closely allied to industrial chemistry, many metallurgical processes being really chemical engineering on a very large scale. Curiously enough, the excellent exhibit of the Aluminium Plant & Vessel Co. is included in this section, although it consists chiefly of a complete deodorising plant for edible oils and fats.

In other exhibitions the technical Press is usually represented, and it is to be hoped that the educational and commercial value of propaganda for journals, and also for scientific societies will not be overlooked on the next occasion. There seems no reason why several of our societies and journals (and perhaps also booksellers and publishers) should not join forces and have a stall at these functions to the advantage of their membership, influence, and circulation. The refreshment rooms and the cooking installations of the Gas Light & Coke Company and British Electric Transformer Company are a pleasing innovation. All parts of the exhibition are well labelled, and the suspended direction arrows pointing towards the various sections of the exhibition are ingenious and useful.

In conclusion, tribute is due to the services, generously given, of Sir Richard Gregory and the organising committee, while it says much for the energy and foresight of Mr. F. S. Spiers, the organising secretary, that on this occasion the exhibition was practically complete and ready on the opening day.

Speeches at the Opening

At the opening last week of the British Scientific Products Exhibition in the Central Hall, Westminster, tribute was made to the remarkable work done by scientists during the war. Lord Sydenham presided.

Sir Richard Gregory, explaining the object of the exhibition, said that it was essential for us to avail ourselves of scientific research, if we were to secure improvements in the commercial and industrial methods of pre-war days. The exhibition held last year in London and afterwards in Manchester showed how, under the stress of war, we had made ourselves independent of products previously obtained largely from enemy countries. The object was to promote the development of the industries

established and to encourage the formation of new British manufactures depending upon progressive science and invention. The exhibition afforded an opportunity for vindicating the supremacy of Great Britain in the field of discovery and invention. It showed the strength and variety of home manufactures, and from it the public might learn that science was indispensable to industry in peace as in war.

Lord Crewe, in opening the exhibition, said that from the beginning of war busy brains were at work trying to re-establish essential industries, which had passed away from this country, and now that Peace had come we were not going to sacrifice the fruits of the skill employed in the recovery of those industries.

Lord Moulton on our War Work

Lord Moulton said that during the last five years he had been in a unique position for judging both the work of the nation and the capacities for work that it possessed. Almost immediately after war broke out he was made the chairman of a Committee that had to consider the things with regard to which we were dependent on Germany, and how we were to replace Germany as a source of supplying those articles. It was found there were three ways in which Germany had got that position. One was that she was far more skilful than we were in cornering the raw materials; the "rings" which secured almost a monopoly of valuable natural products were to him a perfect revelation. That that must be stopped at the end of the war was obvious. It would be partly by our Legislature, but it would be still more the acuteness and resolution of business men that would prevent Germany getting the monopoly of any natural product and therefore making us dependent upon her.

The next thing that impressed him was the extent to which Germany had got hold of the English market by her being such an excellent salesman. Germany gave great attention to the prejudices and wants of English customers, served her goods in the way they liked best, sent her travellers to solicit custom at all favourable times, and had worked up a very large business by these quite honourable commercial tactics. There, again, there was something which our business men must face; and they must face it, he thought, by imitating the wise policy that the German producers adopted.

Then there was a third thing, which he confessed made him a little ashamed of his country. It was obvious that the Germans were taking pains over particular products so as to produce them of a better and more uniform quality, and therefore making them more valuable to the English consumer. What was more evident than anything else was that the specialised attention which worked at a little thing in order to improve it was being guided by all the scientific knowledge that was at the command of the world. And he found that the English manufacturers were too frequently content with a quality which they could sell in very large quantities, and for which they had a safe market, and were not realising that this advance in quality would gradually bring with it a greater demand, and would make the wholesale trade pass into the hands of their competitors.

It was true that one took care that, as far as we could, raw materials were obtained, in spite of the Germans. It was true that the English manufacturers took lessons from the German salesmen, but the real question which interested him was how should we get England to produce the articles of higher quality at reasonable prices, which they had been enabled to make by means of the patience and industrial research carried out for so many years. We were like an old-established house; they were like a young house that wanted to make a business.

In about a couple of months he was taken from that particular work and put to develop the whole power of his nation in a thing which, he hoped, would be perfectly useless in a very short time —namely, high explosives. There, again, he had to test the power of the nation to concentrate its whole force on production on an enormous scale. The four years he had had to concentrate his attention on that made him feel that our nation had nothing to fear from any nation. All that it had to fear was from its own self. It had got the power of research and of invention, it had got the power of patient devotion to a particular end that it had chosen, and it had got the power of acting together on the largest possible scale. All that was necessary was that the nation should be roused to the necessity of doing it, and then, as they did during the last four years, they would prove that it could do in all this wide production that peace needed what it did in the narrow but equally important war production.

Income Tax and Chemical Companies

Large Rebates Neglected

(By a Barrister-at-Law.)

£262 10s. is the amount of rebate to which taxpayers with an income of £1,000 a year are entitled in respect of the three years ending on the 5th April, 1919. Those enjoying the smallest income subject to income tax, namely, £130, are entitled in like case to £104. This appears to be as startling as it is true. Unfortunately for taxpayers it is not generally known. Some who do know do not take the trouble, and others have conscientious objections to the payment of "conscience" money.

By this latter remark we refer to dividends paid "free of income tax." It is within the knowledge of the writer that a person (AB) holding shares in a chemical company, having an income of £980, suppressed these shares in his return to assessment of income tax under the mistaken impression that because the dividend counterfoils were marked "free of tax" he had not paid tax upon them, but that he would have to pay tax if he included them in his return. The facts are the other way about. The company had already been taxed by the local surveyor at the maximum amount 5s. in 1916-18 and 6s. in 1918-19. A shareholder is part proprietor of a company, and AB as part proprietor had already borne that tax. This may be illustrated by an example: A tax of 5s. in the £ is one-fourth of a £: hence a dividend of £4 minus tax, one-fourth, is £3. That is the same as stating a dividend of 3 per cent. "free of tax." It will be observed in the above case that the fraction to be added to the net amount of £3 in order to arrive at the gross amount of £4 is one-third. The misunderstanding arises, not unnaturally, owing to some companies, which in 1916 paid 4 per cent. free of tax having had to reduce their dividends in 1917 to 4 per cent., less tax deducted. In the former case, 1916, one-third more than 4 per cent. was in reality paid, namely £5 6s. 8d., whereas in 1917 the real 4 per cent. was paid, but the difference was not due to exemption from taxation. It was due to a falling off of profits necessitating a lesser dividend.

AB was entitled to a rebate of 1s. 6d. in the £ in the two years 1916-17 and 1917-18. His holding was £200. He consequently lost a rebate of 1s.6d. in the £ on £5 6s. 8d. and £4, total 14s., by reason of ignorance and neglect.

Rebates for 1918-19 and 1919-20

Businesses and occupations in chemical engineering and other industries are in their growth and are consequently to be found in the three stages of evolution—individualistic, partnerships and companies. The incidence of the income tax differs in each of these cases. The first two are assessed under Schedule D, the last under Schedules D and E. All three are assessed upon the average profits of the three years preceding the return which has to go into the Local Assessor or Surveyor of Taxes by the end of September for payment of the first instalment of 3s. on the 1st of January, 1920. The second instalment of 3s. is due on the 1st of July, 1920, making the total of 6s., which is the maximum. This maximum is charged as a penalty tax when the taxpayer fails to make his return. This maximum is, however, properly chargeable on incomes over £2,500 a year. It is otherwise, however, with proprietary and debenture stock and shareholders. The maximum 6s. in that case is chargeable upon incomes over £2,000 a year. This is due to the distinction between earned and unearned income introduced in 1907.

In all cases the taxpayer may claim a rebate by disclosing the whole of his income. An individual with an income of £500 from unearned sources is taxed £150. He is entitled to an "abatement" of £100 at 6s., *i.e.*, £30, also to "relief" on the balance of £400 at 3s., i.e., £60, total £90; leaving a tax suffered of £60.

He can also claim for:—Child, £25; wife, £25; aged dependent (mother), £25; life assurance, (say) £25; total, £100. This reduces his total tax suffered to £30, instead of £150.

The above figures refer to rebates of excess tax after the maximum tax has been paid. We shall deal next week with returns for the assessment of the graduated tax to be levied.

We take it for granted that taxpayers deduct the income tax before paying ground rent, feu duties, interest and annuities. The tax on bank interest is recoverable otherwise, namely, by a claim after payment. The above items usually come to £100, representing a further refund of £30 at 6s. in the £.

French Metallurgical Policy on the Rhine

A Translation by Sir Robert Hadfield

The conclusions in the following article on "French Metallurgical Policy on the Left Bank of the Rhine," are taken from the recent book "De Fer sur une Frontière," by Fernand Eugerand. The translation has been prepared by Sir Robert Hadfield.

CHAVE it from M. l'Abbé Wetterlé that once, when the German Catholic Centre Party was discussing the attitude to be adopted regarding the question of the canalisation of the Moselle, Dr. Am. Zahnhoft, one of the members for Düsseldorf, to the astonishment of all, advanced this argument against the plan: "We are going to spend thirty millions on this enterprise, and then the French will come and reap the reward of our labours." The constant opposition of the Imperial Government to metallurgical undertakings in the South-west had surely another cause; it was to act as a counter attraction to the metallurgical regions of Lorraine; to prevent the intensive production of pig-iron, and perhaps of other iron and steel manufacturing operations on the eternally disputed frontiers in the regions usurped by Germany. But man, emperor though he may be, cannot separate what God has united—Nature is stronger than political combinations, and the will of the Earth remained unshaken.

In 1912, there were at least eighty-five blast furnaces in Lorraine and the Saar, and forty-three in Luxembourg, having a total production of nearly eight million tons of pig-iron. And Thyssen installed in Hagondange a monstrous works, Gutehoffnungshütte bought extensive areas of land near Thionville for building an establishment for high outputs, Stumm added a steel works to his Uckange Works, the Phœnix Company took steps to establish themselves in Luxembourg, and the question of a Krupp Works in Lorraine was mooted. No matter what steps were taken, metallurgy kept its place, and it developed appreciably on the frontier. If we observe that part of these German metallurgical operations (which, though small in extent, it will be necessary to take into account) had also developed on the eastern frontier in Silesia, we find that when the War broke out in 1914, out of her 355 blast furnaces, Germany had 165 on her eastern and western frontiers, which alone produced about one-half of the total pig-iron output of the Empire (*i.e.*, 8,785,000 out of 19,291,000 tons).

That was a weak point, and another such might easily have proved fatal. At this same date, out of 50½ million tons of iron ore consumed by German metallurgical works, 28½ millions were drawn from the Lorrainian frontier, and more than 14½ millions were imported. And a specially aggravating circumstance was that the extraction of these 28 million tons of Lorrainian ore was confined, on the frontier, to a sector measuring 20 km. by a maximum depth of 6 km., and even of 2 km. at the most active point (Hayange-Moyeuvre).

If the French had strictly guarded the frontier from Longwy to Briey, the French Army could have kept within gun-range nearly two-thirds of the German iron ore, and the blockade would have deprived Germany from getting the remainder. Under these conditions a Franco-German war should have only been an engagement of short duration—had we but known in France. But did we know?

As the Germans had put their Lorrainian basin under the protection of the forts of Metz and Thionville, our Briey frontier was defenceless; the German Army, even before the declaration of war, took the essential points of the Briey basin without striking a blow, and so nullified the danger of having their ore supplies cut off and their metallurgical output reduced—inflicting on the enemy by a counter-stroke the two-fold injury which was feared by him.

The Future Position

But let us leave the past and turn to the future.

A State reason directed German policy against metallurgical operations in Lorraine and the Saar, and at the same time against the industries of those two regions, which were positively isolated from the rest of the Empire, that is to say "economically exterritorialised."

By the return of these regions to France, with whose destinies Nature has expressly associated them, they will again, by force of circumstances, enter fully upon that prosperity which has so long been denied them, because it will be to the interest of France to develop them thoroughly.

The surest means will be to exploit fully the collieries of the Saar. Output must be intensified, thus enabling metallurgical coke to be made from the coal extracted. As Germany had an abundance of coal, it was naturally to her interest to restrict the output of these collieries. France, poor in coal, must, on the contrary, see that they are worked to their fullest capacity, so that these regions of Lorraine, as well as the entire country, may be benefited.

This is a State matter, and, in my judgment, the best method will be for the French Government to take the place of the Prussian Treasury, not only in the possession, but also in the working, of these collieries.

It is indispensable that the French Government be the driving force of industry in these regions, and that it preserve a rather strong vehicle of authority. It is only in this way that it will be able to develop industry and assure reasonable prices; and perhaps the French administration will be able to remedy the unsuitability of these coals for metallurgical purposes by offering a reward to the inventor who is able to achieve this.

Lorraine, with its ore and colliery centres thoroughly reconstructed, will be able to fulfil to the uttermost its metallurgical destiny, and as French metallurgy will pass from under-production to over-production, an export policy will be necessary, and an overseas market must be created for these industries, which can only be done cheaply by the double canalisation of the Moselle and the Saar.

To withdraw Lorraine and the Saar from Prussia, which she took from France, is to remove her metallurgical hegemony and this only France can do. For Westphalia, which will remain the only centre of German iron and steel production, will not for some time to come have any other iron-ore than what France will be willing to export to her. We shall therefore be the controllers of the cost price; but under no circumstances must we leave these delicate commercial operations to individual interests without the Government having a share or control in them. The national interests demand that the exportation of the ores should at least be controlled—perhaps even regulated—by the State.

It has been said over and over again that the problems before the Peace Conference are without analogy or precedent. Perhaps that is true in so far as the methods are concerned but not as regards the object. These operations of national polity are, as a matter of fact as old as the hills, and consist in taking from a State which disturbs the order and peace of the world all power for hurt and aggression. This is exactly what was done to us in 1815.

The work of the treaties of 1815 was detestable, and in short abortive, for Europe was embroiled during a century in order to replace an imperialism of ideas by an imperialism of business. But it must be recognised that the immediate object was only too well attained, in that it took from France all possibility of initial offensive, and placed her on the defensive by pushing back the military frontier behind the political frontier.

Such was, on the confession of those who inspired it, the secret of the frontier to which we had to submit in 1815 and 1871. The primary object of the future Peace treaty must be to turn the tables on Germany by taking from her strategically all ability to attack, and in this way place her on the defensive.

Methods of Procedure

This result can be attained in several ways; the laying down of the frontiers is assuredly one of the most practical means.

The Rhine is evidently the dividing line between Central Europe and Western Europe; this is the natural frontier of Germany, and it must also be her political frontier. "The Hindenburg Line ought to be drawn along the Rhine," declared Lloyd George two years ago. This being so, is it right that

France and North Germany should have a common frontier? Would it not, on the contrary, be preferable when our historic frontiers are restored to leave the rest of the left bank safe with Prussia driven out; to keep the region disarmed, and to leave it to the Allies to control the principal crossing points and centres of communication? To sum up the situation in a word: "Put our military frontier not behind, but in advance of the political frontier."

This is the true solution of the Western question.

This is the old military method—it must not be brushed aside in disdain. Precaution is necessary; politics must foresee the worst, and see things as they are and not as they ought to be, or as one would have them. Let us be realists. The best Peace organizations are merely human and, consequently, fallible. The country which is thought to be held in check may break bounds more quickly than was expected. In this special role it is we—France and Belgium—who will have to bear the brunt. Let us, then, watch closely, and not sacrifice our safety to a pretty fancy which events may easily dissipate.

But there are not only military methods for the assurance of Peace—there are economic methods; for the force of circumstances is stronger than human force.

It was owing to her metallurgical position that Germany was able to hold out so long against the world in arms. It was her metallurgy which contributed most to her conduct of the War. The president of the Military League and the president of the Naval League those hot-beds of pan-Germanism were recognised to be in the pay of Krupps. Now the greater—and the most offensive—part of these metallurgical operations was laid in Westphalia, and it was only centred in that part of the German Empire because the German Government wished it so.

An industry is generally localised in the region of its raw materials, and if there are two, the choice rests on the region where the requirements for such raw materials are the heavier. Iron ore was in this category, and it is only found to the west of the Rhine, on the very frontier of 1871. The right bank only possesses coal. German metallurgy, then, was irresistibly attracted to the left bank of the Rhine, and to the region of Lorraine and the Saar, where (as nowhere else in Europe), coal occurs together with the ore. These regions, in addition, had by the Moselle and the Saar access to the finest means of transport, viz., the Rhine.

The left bank of the Rhine and Lorraine are excellent regions for metallurgical operations. Recognising better than France did the peril of a metallurgical concentration on one frontier, the German Government did everything in its power against it, and it must be acknowledged that their policy in this direction was a miracle of foresight and skill. The Germans were successful in overcoming the dispositions of Nature, and maintained their principal metallurgical operations (including all those intended for war purposes) on the right bank of the Rhine in Westphalia. This they succeeded in doing by all manner of trickery, and by systematically paralysing the manufacture of the Saar coke and rendering it useless for blast-furnaces; and above all, by obstinately refusing to proceed with the canalisation of the Moselle and the Saar. These two courses resulted in the left bank of the Rhine being closed to German metallurgical operations. But this was an arbitrary choice; the force of circumstances is always there, and is working in our interest and in the interests of those regions, and for the peace of the world.

Is it not evident that Germany's powers of offensive would be removed by attracting, and if possible concentrating, her metallurgical operations on to this unprotected left bank, on to this slope, as a hostage, by placing the territory on the left bank of the Rhine in the iron country and thereby bringing German metallurgy under the fire of our guns.

A Practical Policy

This is not a dream, imagination, or fancy; we have in our hands all the means for its realisation.

We hold and we shall dominate German metallurgy for a long time simply through this question of ores, which can only be found in sufficient quantities in Lorraine. Already we hear the appeal of the iron and steel industry on the right bank: "If an importation of ore from Lorraine is not made quickly"—we read in the *Rheinisch-Westphalische Zeitung*, for December 21st, 1918—"our blast furnaces must shut down, as, owing to imports from Lorraine having ceased, the great industries on the right bank of the river must cease work." A differential tariff on minerals intended for either bank of the Rhine would of necessity attract metallurgical operations to the most favoured bank, inasmuch as the pretended unsuitability of the Saar coke for metallurgical purposes was merely a blind.

But in order that German metallurgy may be established on the left bank of the Rhine, it is necessary that the region should be provided with the requisite means of communication, and above all, access to the Rhine. The canalisation of the Moselle and the Saar is indispensable, and should be expressly provided for in one of the clauses of the Peace Treaty.

Decided upon in 1870, and practically carried out as far as Metz in 1871, the canalisation of the Moselle was to be effected in accordance with the Treaty of Frankfort, but the Germans evaded this obligation, in spite of the protests of those interested. The cost, however, was not very great—40 millions for the canalisation of the Moselle, and 27 millions for that of the Saar. In 1911, the Duisberg Chamber of Commerce gave the following as the reason for its rejection: "The execution of such a plan would certainly cause the Rhenish-Westphalian iron and steel industries to emigrate to the south-western region in order to profit by the proximity of iron-ore."

In fact, the canalisation of the Moselle would have reduced the cost-price of pig-iron for Lorraine by about two marks, and the cost of transport of the finished products by more than three marks; and the canalisation of the Saar would have had the same effect in regard to the iron and steel works of that region. Under such conditions as these, Westphalia would have been unable to bear the blow.

What Prussia has stubbornly refused, France must do, for, in addition to a political reason, there is an economic necessity.

By having returned to us the metallurgical works in the regions in Lorraine which were formerly annexed by Germany, we shall now more than double our output of iron and steel and pass from a state of under-production to over-production, which will render necessary an export policy. We must open up an overseas market for these industries, and those incomparable waterways will assure it naturally.

It appears, then, indispensable that a clause should be embodied in the next Peace Treaty to ensure to France the right to undertake the canalisation of the Moselle and the Saar. The consequences of such a measure for the peace of the world are evident.

German metallurgy, which played such a part in the War, must lose its offensive quality. The surest means is to remove it to where its interests lie, viz., on the left side of the Rhine, on the slopes, in the regions where the initial fighting occurs. When she recognises that the destruction of her metallurgical industry will be the first outcome of a war and of German aggression, it is ten to one that she will rapidly become pacifist.

Obituary

MR. HOLBROOK GASKELL.—The chemical trade of Liverpool has sustained a loss by the death of Mr. Holbrook Gaskell, of Erindale, Frodsham, at the age of seventy-two. He was intimately identified with the commercial interests of Liverpool and district, and especially with the development of the chemical trade. He was a partner in the large chemical manufacturing firm of Gaskell, Deacon & Co., in Widnes. In 1890 he became a director of the United Alkali Company. He was a chemist of considerable ability, and his knowledge of the chemical industry made him a member of the board of the United Alkali Company, upon which he sat for thirty years, being compelled owing to failing health to retire last December. Mr. Gaskell wielded considerable influence in commercial matters. He did not appear much before the public, but devoted his activities mainly to developing trade interests.

PROFESSOR A. J. BROWN.—The death took place last week at Birmingham of Professor Adrian J. Brown, M.Sc., F.R.S., who, since 1899, had been professor of biology and chemistry of fermentation at the Birmingham University, and Director of the School of Brewing. He was a son of the late Mr. Edwin Brown, F.G.S., of Burton-on-Trent, was for a time an assistant at St. Bartholomew's Hospital, and afterwards a brewing chemist at Burton-on-Trent. He was the author of several works on chemistry. At one time he was examiner on biological chemistry at the Institute of Chemists. The professor's wife died on Sunday week, and the two bodies were interred together at Northfield, Birmingham.

The Devastated Factories of France

Notes by British Chemical Delegates

DURING the recent visit of delegates representing the British chemical industry to France in connection with the movement for establishing an inter-allied federation of chemists, a visit was paid to the districts of Chauny, Tergnier, and St. Gobain, when they had an opportunity of seeing the destruction wrought by the Germans. During the visit, a number of photographs were taken by Mr. Edwin Thompson, one of the British delegates, and two of these are reproduced below.

Dr. Miall, in an article in the *Journal* of the Society of Chemical Industry, has given some impressions of what he saw. "At Chauny," he states, "the delegates were shown round the ruins by the Compagnie de St. Gobain, whose works were destroyed at the same time as the rest of the town. This area was the scene of some fighting, but the destruction was not caused in the fighting; it was a cold-blooded piece of work with two objects in view, one to make the country uninhabitable for the French when the Germans were driven out, the other to put an end to the industry there carried on, for the benefit of their German competitors. For about three weeks the Germans carried on their work of desolation, removing everything of value, blowing up the buildings, burning anything which would burn, smashing up any machinery which they could not carry away, and reducing a pleasant and prosperous little town to a deserted heap of ruins. We were told that many towns and villages in the district met with a similar fate. It was a most impressive sight, and helps us to realise the unchanging attitude of the French, a nation whom our ignorant forefathers considered fickle and volatile."

PROFESSOR HENRY LOUIS AT CHAUNY

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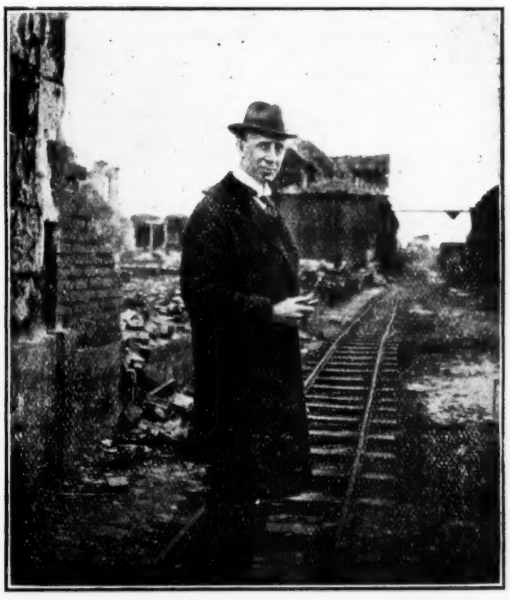
Some additional notes on the devastated factories are published in the current number of the same *Journal* from Mr. W. F. Reid, another of the British delegates. Referring to the celebrated chemical works of the St. Gobain Co. he states that the first plate-glass was made on the large scale at St. Gobain in 1693, the invention of the process being attributed to Abraham Thévart and Lucas de Nehou, who made their experiments at the rue de Reuilly, Paris. The ancient Romans, however, made rough plate-glass by casting; there are samples of glass sheets made in this way in the museums of Pompei and Reading. The plant destroyed by the Germans was on a very extensive scale, being capable of turning out sheets of polished plate-glass 27 feet long and 12 feet 6½ inches wide. The more portable parts of the machinery were stolen, and the remainder wrecked by charges of explosive. Wired plate-glass was made at Chauny by Appert's process, and the way in which this glass resisted the effects of the explosions bore elequent testimony to its utility. Among the ruins lay tangled masses of fine steel wire upon which beads of various colours were threaded. In the manufacture of beads, as formerly carried on, pieces were cut off small glass tubes of diameters corresponding to the size of the beads. The pieces of tube thus obtained were rounded off by revolving them at a red heat, in a mixture of powdered lime and charcoal. Apparently the St. Gobain beads were supported on steel wire during the heating, giving them a very brilliant surface.

Many of the buildings had been cleared of all machinery before they were destroyed, and so thoroughly were these depredations organised, that a railway was built into the factory by the Germans. Where the plant was not worth removing, the whole factory was wrecked by a charge of explosive. In the case of power plants the boilers were rendered unfit for use either by explosive charges detonated inside them, or by larger charges underneath them, which destroyed both boilers and boiler house.



DR. STEPHEN MIALL AT CHAUNY

In the destruction of the chemical factories at Chauny, German experts and manufacturers assisted, and pointed out the most valuable and least easily replaced portions of the plant belonging to their French competitors. It was at Chauny that the first commercially successful plant for working the Leblanc soda process was erected, and the factory continued working until destroyed by the Germans. Nicolas Leblanc obtained on September 25, 1791, a patent for working his process. The Duke of Orléans, better known as "Philippe Égalité," advanced sufficient money to build a small factory at St. Denis, Paris, which was called "La Franciade." In 1793, the Duke of Orleans lost his head, and La Franciade was taken over by the State, but proved unsuccessful. Afterwards the process was started at Chauny, and the neighbouring factory of St. Gobain exhibited glass made with Leblanc soda in 1806, the same year in which poor Leblanc committed suicide in his ruined factory.

The caustic soda factory at Chauny appears to have aroused especially malevolent feelings in Teutonic breasts.

The strike of dyers and finishers in the Nottingham and Leicester areas threatens seriously to affect the hosiery industry in the Midlands.

Peace Treaty and Mineral Fields

THE economic clauses of the Peace Treaty are well worth study from the commercial side, for they constitute some of its most important provisions. These are carefully reviewed by "H. L." in the current number of *Nature*. The Treaty of Peace, he writes, has taken into account the economic relations of the contracting parties and the effect upon these of the peace conditions to a degree that has never been approached in any previous document of the kind. It is not too much to say that, whereas all previous peace treaties have been essentially diplomatic, the present one is essentially industrial in its outlook. The only mineral rights specifically referred to are those involved in the cession of the coal basin of the Sarre to France; it is difficult to understand, by the way, why, in the published English version of the Treaty, the German spelling of the name has been used instead of the French. This cession bulks very large in the Treaty, but is of far less importance than would appear at first sight. It is estimated that the total quantity of coal contained in the Sarre basin is only 5.7 per cent. of the total quantity owned by Germany, so that the loss to Germany in respect of coal reserves is insignificant. From the point of view of annual output it is somewhat more important; Germany produced in 1913 about 191½ million tons of bituminous coal, out of which the Sarre district produced about 14 millions, or rather more than 7 per cent. On the other hand, the possession of this coalfield means a great deal to France.

Before the war the total coal output of France was about 42½ million tons, so that the Sarre coalfield will increase the ultimate producing capacity by about 33 per cent. Of the total production nearly 22 million tons came from the Pas-de-Calais district, whilst the Nord district produced nearly 8 millions—about 70 per cent. of the entire production. These two districts have been almost wholly wrecked by the Germans; owing to the configuration of this coalfield, in which the coal-measures are overlain by secondary, highly water-bearing strata, it was easy to do very serious damage by merely blowing in the watertight shaft linings and thus drowning out the pits; owing, further, to the fact that many of the more important collieries are connected by drifts with each other, recovering merely a few of the shafts or even sinking new ones will not suffice, and practically all the old shafts will have to be re-lined before production on any reasonable scale of output can be commenced. It cannot be hoped to do this in less than five years.

The Peace Treaty provides that due diligence shall be exercised in the restoration of these mines, but that Germany shall make up any deficiency in French coal output from these areas for ten years, the quantity to be thus delivered not to exceed 20 million tons annually for the first five years, and 8 million tons annually for the next five years. Furthermore, Germany is to supply France with 7 million tons a year for ten years, 4½ to 8½ million tons yearly to Italy, and a certain quantity also to Luxembourg. At the most, however, Germany will not have to provide more than about 32 to 35 million tons a year, or about one-fifth of the output left after the Sarre basin has been handed over. The price to be paid for this coal is to be the German pithead price, provided that such price does not exceed the British pithead price for export coal. Thus, incidentally, the Sankey award has had the result of enabling the Germans to charge our Allies 4s. 6d. per ton more for coal than they would otherwise have been able to do.

It is possible that Germany may lose a certain amount of her Silesian coal to Poland, but it seems clear that at the worst Germany will retain more than two-thirds of her coal reserves, and, as these were originally about two and a half times our own reserves, and more than half the total coal of all Europe, she is not seriously weakened in this respect, although France is undoubtedly strengthened.

No other minerals are specified in the Peace Treaty, but it is well known that the restoration to France of Alsace and Lorraine will have a profound effect in many respects. First of all France re-enters into possession of the whole of the Lorraine iron-ore fields; the vast deposit of "minette" thus becomes wholly French, with the exception of a small amount within the frontiers of Luxembourg, and, now that the latter country ceases to form part of the German Zollverein, it may be hoped that this ore will be diverted to Belgium, where it ought to go. Before the war Germany produced from the conquered province of Lorraine about 21 million tons of iron ore, or about three-fourths of its total output, so that the loss of Lorraine is for Germany an extremely serious matter. On the other hand, France is tolerably rich in iron ores, and the additional quantity of which she resumes possession will not matter to her very much, except for the fact that she can dispose of her surplus to other nations. Above all, the cardinal fact, which makes for world-peace more than would a dozen Leagues of Nations, is that Germany has no longer the iron-ore supplies with which to manufacture the immense stores of munitions which she would need if she were to commence the next war.

Another important point, equally well known, is that, with the rich potash deposits of Alsace in French hands, the German potash monopoly is broken, and the rest of the world is no longer bound to come to her for that important product. Thus it may be said that Germany has lost a large slice of her mineral assets; to maintain her position will need all the industry of her hard-working population, and it is more than ever clear to-day, with the Peace Treaty before us, that the future belongs to that nation which chooses to put in most real, steady, hard work for the next ten years.

Fortuna Nitrate

Experiments with Low-Grade Treatment Process

AT the annual general meeting of the Fortuna Nitrate Co., Ltd., the chairman (Mr. H. C. Gibbs), stated that though the company made a good profit last year, there would be heavy expenses to meet during the current year, and no certainty that they would be able to sell any appreciable quantity of nitrate.

The demand for nitrate, he said, practically ceased on the signing of the Armistice in November last, and stocks have been accumulating in Chili ever since. Owing to the policy of providing tonnage for purposes considered more urgent, the Allied Governments have not yet seen their way to allocate shipping to the nitrate industry, and the consequence is there are now about 1,500,000 tons in Chili which cannot at present be transported to the various consuming markets. Until the situation is relieved, it does not seem wise to continue the production of an article for which there is no outlet. Principally on this account we closed oficina Aurelia in January, and oficina Carmela in April, and we have only kept Celia open in order that we might continue our experiments with the new process, and ascertain whether it is possible to treat the large amount of low grade material in those grounds at a profit.

The company's stock of nitrate unsold must now amount to about 415,000 quintals, and is increasing every month by the production in Celia, and this means an additional heavy cash requirement. Thus the board would have been justified in recommending that no dividend should be paid until the cash position had become more comfortable. On the other hand, as the net earnings in 1918 amounted to 23½ per cent. on the capital, and as we passed our dividend last year, it seemed right that we should recommend a small distribution. It is difficult to form an opinion as to when an improvement in the general condition of the nitrate industry may be expected. It largely depends upon the availability of adequate tonnage. This company, together with all other British nitrate companies, has joined the association of Producers with the object of safeguarding our common interests at a critical time. Opinions differ also as to the prospects of the consumption of nitrate for next season, and though it is impossible to make an accurate forecast, it seems likely that, owing to the shortage of tonnage, the stocks now in Chili will be more than sufficient to load any tonnage that may be available for next season's requirements.

You will be interested to hear what progress we have made with the new plant at Celia. From reports which have been received at various times, and excluding all material of under 12 per cent grade, there were estimated to be about 9,500,000 quintals of exploitable nitrate still available on December 31 last. In addition, there is a large amount of nitrate contained in the material of under 12 per cent. grade which has never been calculated exactly. It may be inferred, however, that the company has a fairly long lease of life before it, provided that means can be found to work the low-grade deposits economically. The results of the May working are distinctly encouraging, yet it would be wise to suspend any definite judgment until the plant has been in operation for a longer period; for though the new process is apparently much more efficient than work under the old system, it has not yet been proved that the large quantities of lower-grade material which exist in the grounds can be worked at a profit under the new system.

Chemical Industry of Canada

Formation of an Institute of Chemistry

THE second annual convention of Canadian chemists and the annual meeting of the Society of Chemical Industry of Canada at Montreal were of more than usual interest this year, and the proceedings are reviewed at length in the current issue of the *Canadian Chemical Journal*. For those (it states) who are not perfectly familiar with the development of chemical societies in Canada it may be explained that the Society of Chemical Industry is Empire-wide, and, in fact, international in its scope. In 1902 the first branch in Canada was established in Toronto, and since that time the growth of the Society has kept pace with the industrial development of the country. Branches of this Canadian section have been since established in Montreal and Ottawa. In November, 1917, the chemists and manufacturers of Vancouver organised the Canadian Pacific section of this Society Manitoba and the Maritime Provinces have their own independent chemical organisations. The Society of Chemical Industry has a broad field, and includes in its membership all those who are interested in chemistry in any way.

In May, 1918, the first convention of Canadian chemists was held in Ottawa, and at this meeting an organisation committee was appointed, with Professor M. A. Parker as chairman, and H. J. Roast, of Montreal, as secretary. During the year, and after much thought, a plan of organisation was worked out, and this became the basis of the discussion at the convention in Montreal.

The Society of Chemical Industry came to its annual meeting after the most successful year in its history in Canada. The membership has been greatly increased in all branches, and the importance of the organisation has been realised in a larger way by an increasing number of business men and manufacturers.

It could only be expected, then, that an exceedingly lively annual meeting and convention should follow, and there was no disappointment. Two days were found to be far too short to do justice to the programme and discussions. Papers were given by Mr. J. R. Donald on "The Inspection of Explosives and Chemicals during the War," and by Mr. A. F. G. Cadenhead on "Some Shawinigan Falls Chemical Industries." In both papers the wonderful work that had been accomplished by Canadian chemists and engineers was manifestly evident. The quick grasp of the situation and the sense of the importance of what Canada could do is a record of achievement not surpassed by any other country in the war. At the time the Ministry of Munitions had everything to do at once, and there were few skilled technical men available. Under the pressure, things were done and research accomplished in periods of months which in normal times would have taken years, or would probably never have been initiated in Canada at all.

Some of the industrial plants of the city were visited. The choices available were the St. Lawrence Sugar Refineries, Ltd.; Canadian Consolidated Rubber Co., Ltd.; Dominion Glass Co.; Canadian Vickers, Ltd.; and the filtration plant.

At other meetings Messrs. Speakman and Newman presented papers on the manufacture of acetone by a fermentation process and the production of M.E.K. (methyl ethyl keton) from normal butyl alcohol. The work done by the British Acetones, Ltd., of Toronto, in this connection was of the very greatest importance, and represents a new standard for production by such a method. The problem was one of complete sterilisation on a large scale, and as worked out was most successful. The necessity for acetone was very great, and for a time this Toronto plant was producing over 75 per cent. of the total supply for the British Empire. Mr. J. A. Dawson, chairman of the Canadian Pacific Section of the Society of Chemical Industry, presented a paper on the growth and development of chemical industries in that province. The market available from Vancouver, taken along with the known resources of the province, makes it certain that manufacturing industries of the greatest magnitude must rapidly spring up. With coal, iron, oils, and electric power backed up by forest and agricultural wealth, the future of this province is bright indeed.

Canadian Institute of Chemistry

The really big interest of the convention was the launching of the new Canadian Institute of Chemistry, and it may now be said that the ship was most successfully started on its way with a very excellent captain and crew. The operations, however, were not finished without news items of considerable interest. The Chemists' Organisation Committee had prepared a programme of procedure and a report. In general, it was decided that a purely Canadian organisation of chemists was most suited to conditions in the Dominion. Two classes of members in this Association were recognised: fellows and associates. University graduates in chemistry and those who hold positions of importance in industrial plants or are thus engaged in other chemical work will be eligible as fellows, while those who are engaged in chemical work, but have not qualifications as determined by an examining body in the Institute, will be eligible as associates. The age qualification for the fellowship is twenty-four years. There seemed to be very little doubt but that the majority present favoured a purely Canadian Institute—Dominion-wide in scope. Some difference of opinion arose regarding the proper methods of procedure, but it was evident that all hoped for positive action. It was finally decided that the question of original members should be solved by appointing a representative committee who would form the nucleus of the original membership, and whose duty it would be to elect a chairman and executive, who, in turn, would carry on the work of organisation. It would be fruitless to detail everything that was said in a discussion which lasted for several hours. The report was considered clause by clause, and every effort was made to have procedure go forward on a sound basis. In the end, the above object was very successfully accomplished. Twenty-eight representative original members were chosen as a nucleus from which an executive could be selected. They were chosen in such a way that every province would be represented.

Following the appointment of twenty-eight original members as a beginning, a meeting was held in Ottawa, when a council of fifteen were elected. The results of the election were:—President—Professor J. Watson Bain, of the University of Toronto. Vice-presidents—Dr. George Baril, Laval University, Montreal; Dr. A. McGill, Chief Analyst, Department of Trade and Commerce, Ottawa; Dr. R. D. MacLaurin, University of Saskatchewan, Saskatoon, Sask. Secretary-treasurer—Harold J. Roast, F.I.C., Montreal.

It was decided the fees for Fellows in the Institute should be an entrance fee of $10.00 and an annual fee of $5.00. For Associates, the entrance fee will be made $5.00 and the annual fee $2.50. The secretary announced the first subscription to the Foundation Fund of the Institute, namely, a cheque for five hundred ($500.00) dollars from the James Robertson Co., Ltd., Montreal. The office of the Canadian Institute of Chemistry is in the Kingdom Building, Beaver Hall Hill, Montreal.

The closest kind of co-operation was everywhere in evidence between the Society of Chemical Industry and the Canadian Institute of Chemistry. Large common interests must always unite these organisations, and this division of chemical labour can only end in the general development of a larger interest in the importance of chemistry to industry. The Institute of Chemistry will be able to rightfully claim the attention of Provincial and Dominion Governments because of the technical qualifications of all its members, while the Society of Chemical Industry will link up the technical men with the business world, and should be found a great factor in bringing about a keener public conception of the relative position of chemistry in the industrial development of the country.

Several resolutions were passed, dealing with such important matters as the disposal of chemical patents held by enemy countries in Canada, the necessity for cheaper alcohol, and the advancement of education within the Dominion. Mr. C. Hazen introduced a resolution strongly recommending that the legislation before the House of Commons designed to supply excise-free pure ethyl alcohol for industrial purposes be adopted by the Government. Mr. S. J. Cook, of Ottawa, moved a resolution pointing out the desirability of action at securing for Canadian manufacturers enemy-owned patents before the signing of the peace treaty made this a more difficult matter. A resolution was moved recommending compulsory education up to the age of fourteen years, with a possibility of continuing for two years longer. The Ministers of Education in all the provinces were urged to support further training in citizenship, and advance both the salaries and requirements of many classes of teachers.

Conjoint Board of Scientific Societies

The Work of The Past Year

According to the second annual report of the Conjoint Board of Scientific Societies the total number of constituent societies is now fifty-four, and these include the Institute of Chemistry (represented by Sir James Dobbie and Sir Herbert Jackson), the Society of Chemical Industry (Sir George Beilby), the Chemical Society (Professor P. F. Frankland and Dr. A. Scott), the Physical Society (Professor C. H. Lees and Dr. S. W. J. Smith), the Institution of Petroleum Technologists (Sir John Cadman), the Faraday Society (Mr. W. R. Cooper), the Institution of Mining and Metallurgy (Professor W. Frecheville), the Institute of Metals (Sir Thomas Rose), the Biochemical Society (Professor A. Harden), the Society of Public Analysts (Dr. S. Rideal), and the Institute of Brewing (Mr. A. R. Ling). During the year five new committees were appointed and one discharged. The Iron Ore Committee has completed its work, but is maintained in existence.

The enlarged committee mentioned in the first annual report was requested by the Conjoint Board to consider the question of the inclusion of applied science in any catalogue of scientific literature that might be recommended. Certain of the technical societies were requested to nominate members. The constituent societies were circularised on certain points, and an interim report was drawn up for submission to the executive committee at its June meeting, with a request that the resolutions might be conveyed to the Royal Society, which it was understood was considering the subject in relation to the Inter-Allied Conference on Scientific Organisations in Paris. This was done without expressing any opinion on the report, which is regarded as confidential.

Educational Work

On the resignation of Sir Ray Lankester from the post of chairman of the Watching Committee on Education, Sir Herbert Jackson was elected to the office, with Professor R. A. Gregory as vice-chairman, and Mr. A. Vassall as secretary.

The committee held several further meetings with the Council for Humanistic Studies, the main subject of discussion being higher education at schools and universities. The results of these conferences have been embodied in a pamphlet which will shortly be issued under the title of "Education: Secondary and University."

The Education Committee considered the Education Bill introduced by Mr. Fisher and resolved to express approval of the provision for the extension of the school-leaving age, for continuative education during the day, and for physical training. At the request of the Conjoint Board the Education Committee considered the report of the Commission on Civil Service Examinations, Class I., and a report was presented to the Conjoint Board in December, 1917. The resolutions accepted by the Conjoint Board included the following: "That the provision made for the testing of practical knowledge is insufficient. Neither will the science candidates receive adequate recognition for the large proportion of their time devoted to laboratory work. The Conjoint Board of Scientific Societies would be willing to make suggestions on this point if required."

It was pointed out that a candidate offering higher and lower chemistry and physics, making 800 marks, had no cognate subject available at 200 to complete his total of 1,000. Competent mathematical boys who formerly read chemistry and physics are therefore dropping chemistry altogether, and are inclined to drop physics and devote themselves entirely to mathematics with a view to adding astronomy at the University. The result is a net loss to science of some of the most suitable students.

Scientific Needs of Civil Service

At the request of the Conjoint Board the Committee entered into further consideration of the report, and in October, 1918, a special report was unanimously accepted by the Conjoint Board dealing with the scientific needs of the Civil Service. In this it was stated that the high administrative posts in the Civil Service have for generations been filled by men whose training has been chiefly legal or literary. The many and new problems which the country has had to face on account of the war have shown that this training does not satisfy the needs of the times. We live in an age when science enters into every department of civil life, and when the trained scientific mind is essential for the efficient administration of national and Imperial affairs. A new attitude has to be presented towards industrial problems and their scientific foundation in order to insure the full use of knowledge in progressive manufacture and commerce. This is an essential condition of the economic development of the resources of the Empire and for national safety, and the only way to secure it is by the appointment of a sufficient number of men of high scientific attainments to important administrative posts in the Public Services. At present very few men with scientific knowledge occupy such posts. Even in the Board of Education, with its scientific and technological branches, practically all the heads of departments and chief secretaries are men whose training has been purely in literary fields, while out of the twenty-eight higher administrative posts in the Board only three or four are not occupied by men with classical degrees. It is obvious, therefore, that steps should be taken to provide for an adjustment of the staffing of the Departments of State by which literary and scientific administrators will be more evenly balanced than they are at present. Whatever may be the cause of the preponderance of literary interests on the administrative side of the Civil Service, it is a national necessity for the future effective treatment of the complex problems of modern life that more men equipped with scientific knowledge should be brought into the service.

The Committee's views as to the existing deficiency of science men in the Civil Service, and the means by which it may be remedied in appointments, both during the war and after, are summarised as follows:—

(1) National life in all its aspects is so closely related to scientific methods and results that it is essential to secure the appointment of many more science men to administrative posts than now occupy such places in the Civil Service.

(2) In the selection of administrative officers by nomination during the war, and for some time after, careful consideration should be given to the qualifications of men whose training and interests have been particularly in scientific subjects, and a high value should be placed upon such attainments in comparison with that attached to purely literary studies. In addition, there should be an extension of the executive staffs of various Departments of State by the appointment of men with professional experience in different branches of science and technology to permanent posts without examination.

(3) When normal conditions return and ordinary appointments in Class I of the Civil Service are again made by competitive examination, all candidates should be required to give evidence of having received a satisfactory course of training in science, and the modifications indicated above should be made in the scheme drawn up by the Committee on Class I examinations before the scheme is put into force.

The Metric System

The report of the Metric System Committee, which was in course of preparation at the time of issue of the first annual report, has now been completed. As the matters dealt with are highly controversial, the report has been circulated to the constituent societies with a request for comment and criticism. A large number of replies have been received and have been referred to the committee, which will shortly report on them to the Conjoint Board.

Magnetic Surveys

The Iron Ore Committee, appointed on March 7, 1917, held three meetings and reported that magnetic surveys were carried out in 1917 at Melton Mowbray, and at Irthlingborough by Mr. G. W. Walker, the expense having been defrayed by a grant from the Royal Society.

The chief results are summarised as follows:—It has been proved that the relatively small magnetic disturbances at Irthlingborough may be correlated with the presence there of the bed of Northampton iron-ore. The Melton Mowbray disturbances, however, cannot be attributed either to Jurassic iron-stone, or to any sedimentary deposits which may underlie the area. Any deposits of the ordinary iron-ores (ferrous carbonate or red or brown hematite), had they existed, must have lain so near the surface in order to produce the observed effects, that they could scarcely have escaped detection by ordinary geological examination. These disturbances, on the other hand, appear to be con-

nected with the tectonics of the deep-seated formations. The more important features in the structure are flexures which have brought the older rocks near the surface, and faults which appear to be closely connected with the folding. With the faults there are probably associated basic igneous rocks, bearing disseminated magnetite, similar to those found elsewhere intrusive into carboniferous strata, the faults either serving as conduits for the injections or fracturing them subsequently to their consolidation.

The investigation has thus led to two important conclusions:—(1) With a suitable modification of the instruments the small magnetic disturbances caused by the Jusassic iron-stones are capable of detection, and may be of use in determining the boundaries of concealed fields of these ores in areas not affected by larger disturbances due to other causes. (2) It promises to throw light upon the tectonics of the older rocks where overlain by more recent formations, and thus to afford assistance in solving problems of great practical importance, such as the determination of the limits of concealed coalfields.

Water Power of the Empire

The Committee began its work in November, 1917. It has communicated with a number of Government Departments, and with authorities on science and engineering throughout the Empire.

The main conclusions to be drawn from the evidence available to the Committee are:—(1) That the potential water-power of the Empire amounts in the aggregate to at least 50 to 70 million horse-power. (2) That much of this is capable of immediate economic development. (3) That, except in Canada and New Zealand, and to a less extent in New South Wales and Tasmania, no systematic attempt has as yet been made by any Government Department to ascertain the true possibilities of the hydraulic resources of its territories, or to collect the relevant data. (4) That the development of the Empire's natural resources is inseparably connected with that of its water-powers. (5) That the development of such enormous possibilities should not be left to chance, but should be carried out under the guidance of some competent authority.

In view of these conclusions the Committee recommend that the British Government bring before the notice of the Indian Government, of the various Dominion Governments and of the Governing Bodies of the Crown Colonies, the necessity for a close systematic investigation of all reasonably promising water-powers, and of their economic possibilities; that where such an inquiry is beyond the powers of any governing body, the British or Imperial Government place the work under the direct control of an Imperial Water Power Board or Conservation Commission; and that the Government take steps to initiate the formation of such a Board or Commission, to include a representative from each of the Dominions and Dependencies.

The Committee has obtained further information, and is now engaged on the drafting of a second report, which will be issued shortly.

Glue and Other Adhesives

At the instance of Colonel O'Gorman, the question of the supply of glue and other adhesives for aircraft manufacture was brought before the Executive Committee, and a committee was established to deal with the matter. A deputation from the committee waited on Sir William Weir, of the Air Ministry, and made a statement to the effect that the supply of raw materials was likely to be precarious, and that scientific research into adhesives would result in improving the product and standardising the methods of testing and manufacture. The Air Group of the Ministry of Munitions made a grant of £1,000 for the work, and empowered the Committee to undertake this research on behalf of the Government. The work was placed in the hands of Prof. S. B. Schryver at the Biochemical Laboratory of the Imperial College of Science and Technology. A staff was got together and work began in August, 1918. Several important results have already been obtained, including improved methods of preparing casein adhesive; new glues either of remarkable properties, or made from materials of which there was no shortage, have been made, and the properties of adhesives are being standardised so that waste of raw material and uncertainty in product will probably be minimised. The committee has completed its first report, which is being comunicated to the Air Group, Ministry of Munitions.

Petro-Physical Institute

This Committee was appointed to consider the advisability of recommending the establishment of an Institute to deal with the physical and chemical problems connected with the conditions for the formation of minerals. The personnel of the committee is as follows:—Sir Jethro Teall (chairman), Sir George Beilby, Professor W. H. Bragg, Dr. H. C. H. Carpenter, Professor W. G. Fearnsides, Sir Robert Hadfield, Dr. A. Harker, Dr. J. A. Harker, Dr. A. Hutchinson, Sir Herbert Jackson, Sir Charles Parsons, Sir William J. Pope, Professor A. Schuster, Dr. H. H. Thomas.

The attention of the Conjoint Board having been drawn to the difficulties which arise in consequence of the wide differences existing between the patent laws of various countries, Mr. H. Ballantyne and Sir Robert Hadfield have been asked to draw up a statement on the subject.

English Oilfields, Ltd.

Petroleum Production Prospects in England

At the Annual General Meeting of the English and Foreign Oil Finance, Ltd., last week, the chairman (Mr. W. H. Collier) referred to the successful flotation of English Oilfields, Ltd., with the view of developing oil production in England.

Your directors (he said) have personally visited the English Oilfields works and mine, and we were surprised at the advanced stage of the operations and with the great thickness and richness of the oil shale seams. There is no doubt that a commercial oilfield exists in England, and that, in quality and quantity, the Norfolk oil is equal to all rivals. When there are also present exceptionally favourable and cheap conditions of transport by rail, water, and road, to all parts of the United Kingdom and the Continent, when the situation of the seams in the formation permits of cheap mining, and when the oil content is so held in the shale itself that it may be easily and cheaply extracted, and that, last of all, this valuable oilfield is only three hours by rail from London, its value can be justly appreciated even by the least technical. I have seen notices from critics referring to the sulphur and pointing out its disadvantages. I think we may leave the sulphur questions to the technologists. One thing I do know, and that is that the experts of the English Oilfields, Ltd., have satisfied themselves that they will supply the public with a practically sulphur free oil and spirit equal in all respects to the best brands at present on the market, and this without any more loss in refining than occurs in refining ordinary crude oil from Asiatic or American fields. I have seen the practical way the managers of the English Oilfields, Ltd., are dealing with the problems of extraction and shale getting; I have seen the oil flowing into the tanks, and I am personally satisfied, and my colleagues are personally satisfied, with what they have seen. It was estimated in the reports attached to the prospectus that the company would make profits of 6s. per ton of shale treated, but owing to finding, on mining, that the seams are richer and thicker in certain directions than anticipated, also to the great quantities of best quality paraffin wax found in the oil from some of these seams, as well as the remarkably fine quality of motor spirit and the fact that the residue is specially suitable for the manufacture of Portland cement, the estimated profit of 6s. per ton of shale treated will have to be very much increased.

I understand that on a production of 1,000 tons per day, which, after all, is only a beginning, our production plant will give 45,000 gallons of oil, 70,000 lb. of sulphate of ammonia, and 600 tons of Portland cement per day. I do not include in this category of products paraffin wax, the aniline dyes, vaseline, or medicinal by-products like icthyol, salicylic acid, or other associated drugs, so that you will be able to understand from this brief statement that I am giving you figures which are balanced largely on the conservative side. In reference to cement manufacture, I may say that Nature has provided us with every essential for the manufacture of an excellent Portland cement, even to the location on our properties of some of the finest chalk which can be found in the United Kingdom. Portland cement can be produced at a cost infinitely less than in any other part of the country, but if we say we can produce a ton of Portland cement for 10s. I do not think we are exaggerating.

Petroleum in Norfolk

You will remember that our technical adviser made a public statement about two years ago at a meeting of the Institute of Petroleum Technologists that Norfolk might one day become the source of petroleum. His opinion has been founded, not only on geological grounds, but on actual outpourings of oil in our boreholes, and it may seem that Nature would be false to herself if she allowed oil even in small quantities to flow for such periods

of time as we understand it has recently done, if great quantities of this valuable substance did not indeed really exist in depth. We must also remember that our technical adviser was the first scientist in the United Kingdom to declare publicly, and to give his reasons for so declaring, that petroleum would be found in these islands. The striking of oil in Derbyshire in the Government borehole at Hardstoft has conclusively proved that he was right in his deductions when he stated that petroleum exists in England. We shall look forward, therefore, with great interest to deep drilling on your properties.

You will remember that when your directors transferred your properties to English Oilfields, Ltd., they retained a certain area which our technical adviser recommended us to retain. We are now in possession of borehole results on this area. These are of such a favourable nature that our advisers now recommend that we should at the earliest date float a production company to work this valuable ground. When I first went to Norfolk to see the situation of the properties for which we had negotiated to some extent, the technologist, Dr. Forbes Leslie, who stood by my side, said it was his firm belief that we were standing over an enormous subterranean sea of oil, and that is what is being realised now to a certain extent, but not to such a great extent as it will be in the near future.

Dr. Forbes Leslie said that they had proved that there was no shale in the world whose seams were probably so rich so regular, so thick, and so continuous as those in the Norfolk oilfield. With respect to the criticism that the oil contained sulphur, which made it valueless for the purpose of driving fuel, he wished to point out that the oil they obtained was sulphur free, that the motor spirit was sulphur free, and that the sulphur criticism was nothing more or less than a bogey. He hoped that in the course of the next few months he might be able to lecture to a scientific assembly on this question of sulphur on the Norfolk field, and to be able to prove that not only was the oilfield of great scientific interest, but that it was also of the greatest commercial interest. Regarding the particular area belonging to the English and Foreign Oil Finance, Ltd., he might mention that he had just finished a boring which had given him complete knowledge of the thickness and value of the shale series in that property. His findings within the last two or three weeks had been so favourable with regard to the company's area—that their seams were so thick that they might take it that the area which the English and Foreign Company possessed would give them an output of 3,000 to 4,000 tons of shale a day with a life of one hundred and twenty-five years.

Premier Oil and Pipe Line

Reconstruction Scheme Approved

At an extraordinary general meeting of the Company, held on Friday, a scheme of arrangement for the reconstruction of the Company was unanimously approved.

The scheme was explained by the Chairman (Mr. Frederick Walker). Without venturing, he said, to claim that it is the best conceivable scheme, I can assure you that it is the best practicable scheme. The main and obvious cause of the present state of the company is the war. The whole of the properties, whether oil wells, pipe-lines, or refineries held on behalf of this company by subsidiary native companies or other local representatives, are situated in Galicia—that cockpit of Europe—in which Russians have driven out Austrians, Germans have driven out Russians, and the armies of Poles, Ruthenes, Hungarians, Germans, Russians, and Austrians have fought and struggled for the mastery. The wonderful thing is—not that vast quantities of your oil have been seized by the combatants—not that considerable sums must be expended to repair and restore your plant and machinery to a pre-war condition, but that there is any property left to restore. Those of you who have seen in Flanders and in France the vast desolation caused by war, as waged by the ruthless methods of our late enemies, will feel as much surprise as thankfulness at the information which your directors have received that the damage inflicted on our properties is as slight as is indicated in the directors' circular.

Apart from actual damage inflicted by military operations, a great deal of money will have to be spent to make good defects arising from the neglect of many necessary repairs and renewals during the last five years. If any historian of the future wants to study a concrete example of what we mean to-day by Germany's peaceful penetration he cannot do better than carefully study the history during a few years before the war of the Premier Oil and Pipe Line Co. It is impossible to refrain from a feeling of amazed admiration as one examines the mixture of ingenuity, pertinacity, calculated audacity, and intellectual cunning by which the Germans deliberately and successfully enwrapped the company in the tentacles of Teuton domination, so that probably in a few more years the English shareholders would have found themselves in possession of nothing but useless scraps of paper, while everything of value belonging to the company would have filtered into the hands and pockets of German capitalists, backed up by German banks, supported by the machine-guns and poison bombs of the German Government. The war has cut those tentacles in pieces, and the shareholders of this company may well thank God that the folly, the vanity, and the megalomania of the German Government—backed up by the greed, ignorance, and conceit of the German people—brought about the great deliverance before it was too late.

Dealing with the details of the scheme, the Chairman claimed as its distinctive points that it was absolutely fair all round, that the assessment was very small, that it got rid of two classes of shares which in the past had proved a great evil, and that the reduction in the face value of the shares was very moderate. I am glad, he said, to be able to report to you that the scheme has received almost unanimous approbation from the shareholders who have communicated with us, and from the Press, and also from the Stock Exchange, which I am informed has substantially raised the price of the shares on the strength of the scheme. The number of proxies lodged in favour of the scheme is very large, and not one single proxy has been lodged against it. In fact, the only substantial criticism which I received was from a shareholder who thought the scheme so good that it was not necessary to underwrite it, but I am satisfied that your directors would not have been justified in submitting to the court a scheme of this magnitude without adequate underwriting. This is Independence Day, and I call on you by your unanimous votes to strike a firm blow to secure the permanent independence from German domination of the great industry of the Premier Oil and Pipe Line Company, Ltd.

Degrees in Commerce

Better Training for Business Careers

At a private conference, held recently, at the University of London, South Kensington, Dr. Russell Wells, Chairman of the General Committee for Degrees in Commerce, explained the scheme for those degrees which are about to be established by the University.

The University, he said, wanted to take its share in the great reconstruction that was coming about because of the war. Commerce was a very important factor in that reconstruction. The wealth of this country and its future depended upon commerce, and looking at it from a wide standpoint they were impressed by our deficiency in commercial education compared with that of Germany and the United States.

There were curious deficiencies in our educational system. A certain well-known business man told him that after the war he did not know how he was going to obtain suitable representatives, and he thought that he should have to revert to Germans again. The average Englishman learned languages with difficulty, and adopted the attitude that if he could make himself understood in a business deal that was all that was required. What was really wanted was that our business men should understand the habits of mind of the people with whom they were dealing. We must not enter the war of commerce as badly equipped as we entered the conflict of arms; we had to train our men thoroughly.

With those views the University thought it would be well to try to do for commerce what had been done for medicine. A hundred years ago medicine was in a chaotic condition, but the colleges had now systematised that branch of study. In commerce they met with problems that were just as complicated and required as much thought as in law, medicine, or a dozen other subjects that were recognised branches of University study.

Business Men's Co-operation

If the scheme for degrees in commerce was to be a success they must marry the City and the University, and they had been very fortunate in getting in touch with various leaders of thought and business in the City of London and securing their hearty co-operation. Mr. Balfour had emphasised at the Mansion House the point that they must not make their men so highly trained from an academic point of view that they would be practically useless in commerce. They were bearing that in mind and taking steps to avoid it, but on the other hand they must take care not to make their men merely superior technical clerks.

They had formed an influential committee, which had been subdivided into small committees for various subjects. For example, they had sub-committees dealing with Australian Trade, Banking, Distributing Trades, Eastern Trade, Engineering, Non-ferrous Metals, Printing, Publishing, and Newspaper Trades, Shipping and Marine Insurance, and Inland Transport. Each of these committees had an able chairman and had already done good work. The University professors and teachers prepared a skeleton syllabus and submitted it to the committee, which had improved it; the various sub-committees had sent up reports, which were collated, and a scheme for higher commercial education was elaborated. That scheme was put before a meeting of business men, who had adopted it, with slight emendations, and finally it had been approved by the Senate of the University.

There were to be two degrees: first that of Bachelor of Commerce, which would correspond to the same degree in the other faculties, and secondly there would be the degree of Master of Commerce. The examinations would be certainly no easier than those in Science and Art. The salient idea was that a modern language was to go right through—not taught as in academic circles, but taught as a practical instrument. Among the languages would be Polish, Czech, Rumanian, modern Greek, and the great Eastern languages, Hindustani, Chinese, and the like.

In the first year all students would take practically the same course, and the subjects would be the fundamental basis of the degree. The compulsory subjects would be Elements of Economics, Banking, Currency, Trade (including Transport), and Finance, Geography, with special attention to the geography of products and communications and to the distribution of Industries and Trade; and an approved modern foreign language.

In the second year the compulsory subjects would be common to all, and at the end of that year the student could take the first part of his Final Examination for the Bachelor's Degree. His third year would be spent in preparation for the second part of Final Examination, and in this year his studies were specialised. He might take Banking and Finance, Shipping, Inland Transport, or some special or regional branch of Trade.

After taking his Bachelor's Degree he could proceed to the degree of Master of Commerce. For this, two years' practical commercial experience was required. Work in a merchant's office would be equivalent to the ward work of a physician or time spent in the laboratory.

£500,000 Required

In answer to questions Dr. Wells said that there would be no "approved" offices and that a City editor's office would be equivalent to a merchant's office. They intended to have in London the greatest faculty of Commerce in the world; there would be scholarships (some tenable abroad), and a bureau would be created to help students to study by themselves by giving them advice and directing their reading.

Half a million of money would be required for all the objects he had enumerated. The Cassel Trustees had promised them £150,000 if they raised a like sum by September. Towards this, £60,000 had already been subscribed. Several City men were willing to find vacancies for their graduates every year, and to start them at £300 per annum. The scheme was now ripe, and would come into operation on October 1. The only matter in suspense was the question of a Doctorate of Commerce, which would follow the degrees of Bachelor and Master. A Commerce Degrees Committee had been appointed by the Senate, and would include 10 members of the University and 20 business men. Several leaders of the Government were behind them, and supporting them.

Chemical Matters in Parliament

Cellulose Acetate

LIEUTENANT-COLONEL THORNE asked (1) the Secretary of State for War the names of the firms referred to on page 5 of the Fifth Report of the Select Committee on National Expenditure who were invited to tender in July, 1915, for supplies of cellulose acetate and what was the reason for refusing to send a tender form to the Cellon Company, of London, and who was the person responsible, and his name, who thus refused permission to an English company and invited tenders from a firm of neutrals adjacent to enemy territory, the Cellonit Gesellschaft Dreyfus, of Basle, who were advertising their wares in the enemy Press; and was the Department aware of this firm's advertisements in the "Chemiker Zeitung" when they invited them to tender; and (2) the Parliamentary Secretary to the Ministry of Munitions the reason why in March, 1918, his Department made an Order forbidding the importation of cellulose acetate as indicated in the Fifth Report of the Select Committee on National Expenditure, in view of the fact that all that which was being produced in this country was pronounced to be defective; would he state the names of the contractors who carried out the erection and extension of the British Cellulose Company's work at Spondon, Derby; and whether this was a contract between the Ministry of Munitions and the builders or the British Cellulose Company and the builders?

Mr. Kellaway: I will reply to these questions at the same time. A Committee appointed by the Government is examining this question, and, as was stated by the Leader of the House on July 1st, it is hoped that their report will be ready by the end of the month. In these circumstances I do not think it would be desirable to make any statement at present.

Oil Seeds and Nuts

In reply to Captain R. Terrell, who asked whether, in the interests of the farmer, all restrictions likely to check the free importation of oil seeds and nuts will be removed and every facility given to increase production? The Minister of Food (Mr Roberts) said: I am doing everything in my power to encourage the importation of seeds and kernels into this country, and I know of no restrictions likely to check the supply.

Oil Discovery in Derbyshire

Mr. Kellaway, in reply to Mr. Holmes, who asked the Parliamentary Secretary to the Ministry of Munitions if he were in a position to give the names of those who will constitute the Committee which is to report upon the policy, and the means of carrying it out, concerning the discovery of oil in Derbyshire; what the terms of reference will be; and whether the Committee will be asked to report before the Summer Recess; said he would be glad if his hon. friend would repeat his question on Thursday, when he hoped to be in a position to make a statement on the subject.

In reply to Mr. Holmes, Mr. Kellaway stated that the Government had under consideration the payment of royalties on the oil discovered in Derbyshire, and an announcement of their decision would be made as soon as possible.

Patents (Protection)

Sir A. Geddes, in reply to Sir Herbert Nield, stated that he hoped to be able to introduce the Bill to amend the law relating to the statutory period of protection for patents not able to be exploited during the war, in the course of the next ten days or fortnight.

Fuel and Gas Oil

Mr. Cautley asked the President of the Board of Trade (1) whether, as a consequence of the controlled price of fuel and gas oil, tank steamers are at present lying idle; and whether he will

consider the desirability of reducing the price of oil with a view to the possible saving in the industrial use of coal of some 20,000,000 tons per annum; and (2) whether, in view of the deficiency in the supply of coal and the distress to be consequently anticipated in the ensuing winter, he will remove the restriction that now obtains on the sale of gas and fuel oils, as enforced by an excessive minimum price, and thus permit the sale and use of the existing stocks of such oils for industrial purposes with an equivalent release of coal for public necessities?

In reply Sir A. Geddes stated: The Orders fixing the wholesale prices of petroleum products ceased to have effect as from May 7th last, and there is now no minimum price applicable to the sale of fuel and gas oil.

British Industrial Policy

Self-Government or "Hotel Government"

The great gathering which met at the Connaught Rooms, London, on Wednesday evening, under the chairmanship of Mr. Ernest Benn, and at the invitation of the Industrial Reconstruction Council, to express to Mr. J. H. Whitley, M.P., their acknowledgment of his valuable work on the Whitley Committee, was one of the most representative of its kind recently held. Capital was there and Labour was there, and as the speeches—all good in their way and some quite excellent—proceeded, one began to feel the new and hopeful spirit of *rapprochement* and real partnership in industry which gradually is coming into existence. The guest of the evening put the whole problem in one phase when he said that the alternative to the self-government of industry by means of Whitley and allied councils was "hotel government," and with recent experiences in mind no one present seemed prepared for any extension of bureaucratic control from Whitehall. Mr. Whitley, in a reasoned survey of our industrial position, pleaded for the recognition by Capital and Labour alike that they were part of the common service of the country, and predicted that if the appeal was made to them in the right way they would respond to the call of peace as generously as to the call of war. He compared the old industrial relations of employer and workmen to trench warfare, and expressed the hope that a system which ended with the war would not be perpetuated in industry. Perhaps the highest note was reached when he asked that in the management of industry the worker should be treated as a human being and not as a mere impersonal number.

Sir Arthur Steel-Maitland, in one of the most earnest speeches of the evening, reminded us that a nation which had been beaten in the war might by the pressure of necessity be forced into a united effort to recovery, while there was a danger that the victorious nation might miss the fruits of victory by easing its efforts. Mr. Clynes made an excellent point when he pleaded for the development of workshop committees. The tendency of the workman, he said, was to delegate his responsibilities to the union leaders; he desired every workman to take his own share in determining the rights and policy of labour, and only in that way could they get the real opinion of the British workers. Sir Robert Horne expressed his gratification at the progress the Whitley principle was making, the bodies in existence representing over two million workers already, and other speeches were delivered by Colonel L'Estrange Malone, M.P., Mr. C. W. Bowerman, M.P., and Mr. John Baker. The chairman announced that the Prince of Wales (who was prevented from being present) had sent a cordial message wishing the movement success.

Coal 6s. a Ton Dearer

In the House of Commons on Wednesday Mr. Leng-Sturrock (Montrose, C.L.) asked the President of the Board of Trade whether he could now state if, in consequence of the estimated deficiency in the working of the coal industry, it is intended to raise the price of coal to the consumer and, if so, what will be the effect upon our general export trade in manufactured goods and upon employment.

Sir Auckland Geddes, President of the Board of Trade:—The Government have decided that the price of coal to the consumer must be raised by 6s. per ton from the 16th of this month. (Cries of "Oh.") It is hoped that this increase will meet the increased cost due to the payment of the Sankey wage, the forthcoming reduction in hours, and the diminished output per man-shift. With regard to the last part of the question, I can only say that I am not in a position to give any estimate in detail, but it must be obvious to every one that the increased cost of fuel will seriously hamper our manufacturers for export in their competition with foreign manufacturers, and must affect employment.

German Chemical Factories

Major T. W. Sill, a member of the Inter-Allied Commission to investigate the production of war materials in the German chemical plants in occupied areas, has just returned from the Rhine territory, and reports that German dyestuff plants, all unharmed, are ready to regain their grip on the world's trade.

"Before going through these plants," said Major Sill, "I had often heard of the destruction resulting from air raids, of the lack of workers, and labour unrest. I found the contrary is true. To-day finds these great German plants, probably the greatest of the potential possibilities for war material production, in splendid condition, with a large, trained force of employees, and, moreover, with additional opportunities for increasing their production by utilising extra equipment added for war materials production.

"The original skilled personnel of these plants furnished sufficient means for manning the rapidly enlarged plants which were necessitated by the tremendous scale of operations for supplying war needs, and the additional labour required was easily trained by these forces in the dyestuff plants.

"Furthermore, Germany stands to-day practically as efficient as ever, because she had all of her man power registered and classified in accordance with her pre-war system, and was able from the outset to avoid the mistakes made particularly by the British and French, and by retaining for these plants the highest type of trained labour to insure maximum efficiency of operation. This labour has been carefully conserved throughout the war.

"It has been the popular opinion that Germany was so crippled by her war activity that many building operations could not take place, but frequently I saw in these plants recent developments—in fact, as late as the spring of 1918—for increasing the comfort and convenience of workmen to an extent which would be considered luxury in war time.

"At one of the principal plants the Germans had been reluctant about the manufacture of high explosives, but under the stress of war conditions and the influence of the Berlin administration, as they described it, they erected a large plant for the manufacture of T.N.T. in the near vicinity of their dyestuff works. This plant operated successfully, turning out a large production, having the advantage of trained personnel. This is illustrative of general conditions I saw in the chemical industries in Germany.

"These new explosive plants resembled subterranean dugouts, barely more than the roof showing above ground. The storehouses were protected from air raids, and embankments were placed about the various buildings to prevent the distribution of disastrous explosions.

"Particularly at the largest of these plants, in Ludwigshafen, they were well protected with large anti-aircraft fortifications, and most of the damage reported was done in the city of Mannheim, across the river."

148 Incomes over £100,000.

According to an estimate prepared by the Board of Inland Revenue, there are 148 taxpayers in this country who have incomes of £100,000 and over per year. The taxable income of these is £27,600,000, and they pay in income-tax and supertax £13,352,000. The number of persons with incomes of between £130 and not exceeding £2,500 is 5,286,900, of whom 1,940,000 are entirely relieved from tax. The number of those with over £2,500 and not more than £100,000 is 59,100. The total taxable income is estimated at £1,970,000,000, producing an aggregate income from income-tax and supertax of £338,300,000. Of this sum £109,424,000 comes from taxpayers with incomes of less than £2,500 a year, while £163,393,000 is derived from the largest incomes. Other incomes, which principally consist of moneys held by various companies, bring in a total of £65,484,000. The net produce of the income-tax, apart from the supertax, is £296,000,000.

The Chemical School at Cambridge

At the general meeting of the Burmah Oil Company last week the Chairman, referring to the establishment of a Chemical School at Cambridge, said:

You will have seen in the Press the announcement of the fund that was raised by the leading British oil companies for the purpose of endowing a school of chemistry at Cambridge University. Some criticism has been made, first, on the ground of doubts raised as to whether this expenditure will bring any direct benefit to the company; and, secondly, on the endowment having been granted to Cambridge University rather than to our own university in Glasgow. As regards the first point, I do not share the view that our company is unlikely to derive benefit from this gift. The handling of petroleum is becoming a more and more complex business, and it is within our knowledge that most valuable products have been discovered in certain oils entirely as a result of pure research work carried on in academic centres. Enormous sums are being spent in America upon research work into chemical problems, and these are being largely contributed by the great industrial enterprises. It is obviously of the utmost importance to this company, whose profits are dependent upon a product of which at least 75 per cent. of the world's supplies are produced in America, that the study of the intricate chemical problems on which the progress of the oil industry is dependent should be pursued with at least equal efficiency in this country, as it is only natural that the benefit of the results obtained abroad would first be derived by our foreign competitors. And this brings me to the second point. It is hardly necessary for me to say that I yield to no one in my desire to further the work of Glasgow or the other Scottish universities, but, whilst we may hope to draw our students from all over Scotland and to give them the finest educational opportunities, the educational system of the Empire undoubtedly recognises Oxford and Cambridge as the central fountain heads of education serving the whole Empire.

We in Scotland have been in the habit throughout our history of sending our picked students on to Oxford and Cambridge to receive there the advantages which can necessarily only be derived from a central institution. I need only mention the present Principal of Glasgow University, as well as his illustrious predecessor; both were educated at Scottish Universities, but both being picked students went on to Cambridge to complete their education and measure their talents against the picked students drawn from the whole Empire, and, indeed, from many other parts of the world. And so it is that we fell in with the view entertained by our friends, the other contributing oil companies, that if a great central school is to be created on which the industry can depend to carry forward its research and render it the utmost possible service, it should be located in a spot which, as an academic centre, serves the whole of the Empire, and draws from it the best material from each of the Universities spread throughout the Empire.

In addition to the general benefits which will be derived from the establishment of a great central chemical school there, it is also likely to be of advantage to our company that the endowment of this school by the oil industry will lead to the investigations by that centre of the scientific problems connected with our industry which are growing in importance every day. While, therefore, we share to the full the generous impulse which led our colleagues in the industry to join in the creation of this endowment, I do not hesitate to say, for the encouragement of those shareholders who may feel that we should look purely to material considerations, that I anticipate their deriving a full dividend in years to come from this investment.

In the present state of general unrest throughout the world and with the certainty that taxation in this country must continue on a very high scale for a long time to come, and the uncertainty as to the basis on which it will be levied in future, I feel less inclined than ever to enter into the dangerous realms of prophecy. I will therefore confine myself to saying that as regards the prospects for the current year the outlook at the moment is, taken all over, favourable. While, on the one hand, since the armistice, there has been a decided weakening in the prices of some of our products—especially paraffin wax and petrol—and cost of production and working expenses generally have risen, on the other hand, the reduction of the excess profits duty to 40 per cent. should more than offset these unfavourable features, and I have every confidence that in due course your directors will be in a position to submit a thoroughly satisfactory report and statement of accounts for 1919.

Protecting the By-Product Industry of U.S.A.

WRITING in the middle of last month the Washington correspondent of the *Gas Age* says:—The Ways and Means Committee of the House of Representatives is devoting this week to hearings on the question of legislation that will protect the "war industries" of the country against the resumption of German competition. The largest of these industries is that of coal tar products, which has made great strides under the pressure of war necessity and behind the wall of war embargo. The hearings on this industry have been based on the special measure introduced by Representative Longworth, of Ohio. This Bill provides for an increase in custom duties on practically all coal tar, intermediates and finished products. The increases run from 100 to 200 per cent. "These industries have been made possible by the elimination of competition during the war," said Representative Longworth in explaining his Bill. "We might call them our 'war infant industries,' but they will not live long if we expose them to the competition which the signing of the Peace Treaty will bring. It is of the highest importance to our whole industrial life that such important industries be kept alive. The war taught us how serious it is to have to depend for such materials upon foreign countries, whether friendly or enemy. We cannot take chances now of leaving them to be destroyed by German competition. Thirty millions of dollars have been invested during the war in these industries."

The Department of Commerce made a slight attempt to learn something of the coal tar industry in Germany, but gave it up before its commissioner crossed the enemy line. From other sources, however, it is known that this German industry made considerable progress during the war. The blockade forced the production of synthetic materials of all kinds in Germany and coal tar derivatives furnished a large proportion of these. Medicines, disinfectants, flavours, explosives and even food substitutes, especially saccharine, were made from coal tar. At the beginning of the war it was estimated that the German chemists had worked out about 6,000 coal tar compounds. During the war it is reported this total was increased to 10,000, although many of the newer patents were merely improvements on old processes.

These improved processes, however, are items against which American industry needs particular protection, for these processes are said to have cheapened production costs in many of the more important items. Another feature of the threatened German competition that is important to American manufacturers is the fact that the chemicals and dyestuffs represent enormous values in comparison with their weight and consequent transportation charges. This makes them one of the chief substitutes for money in the efforts of Germany to re-establish a foreign exchange. Her manufacturers will, therefore, be particularly eager to put them on foreign markets, and in this they will be assisted doubtless in every way possible by the German Government.

Keeping Rubber off the Market

AT the annual general meeting of the Consolidated Malay Rubber Estates, Ltd., the Chairman (Mr. Loudoun-Shand) stated that their rubber in 1918 cost 1s. 1.17d. f.o.b. against 11.52d. in 1917, and sold for 1s. 8.72d. against 2s. 0.62d. The crop was 732,319 lb. against 931,212 lb.

The policy of restriction, he said, which is estimated to have kept 20,000 tons of rubber off the market, was a very wise one, and considering stocks in London have risen from about 5,000 tons in pre-war times to 25,000 tons at present, it is obvious they would have been still larger if the restriction had not been carried out. About a third of the acreage under rubber cultivation came into this scheme. Had all come in we might have taken perhaps three times as much off the market, and still have left ample for the present requirements of the world. Rubber seems to be the only commodity which has fallen in price during the war, and plantation rubber is at present lower in price than it has been before, because for the time being supply is in excess of demand. I would have wished to see the system of restriction carried out during the whole of this year. Our crop will be about 1,000,000 lb. of rubber, and I believe if we had been able to reduce this and all others had reduced in ratio, it would have been more profitable to us to make 800,000 lb. of rubber, and dispose of it at the enhanced prices.

A final dividend was declared of 3d. per share, less income-tax, making, with the interim dividend of 3d. a share, a total of 6d. per share, or 25 per cent. for the year.

From Week to Week

Dr. Paul Haas has been appointed to a lectureship in Plant Chemistry at University College, and Dr. Francis W. Goodbody to a lectureship in Medical Chemistry.

Investigations of the resources of Western Australia have been recently carried out on behalf of Messrs. Brunner, Mond, & Co., with a view to the establishment of alkali works.

The Neuchatel Asphalte Company announce the numbers of 31 Four-and-a-Half per cent., and 15 Four per cent. Mortgage Debentures, which have been drawn for payment on September 1 next, at 37, Fleet-street, E.C.

Following upon cremation at Brookwood the remains of Sir John Brunner were buried at Lyne Churchyard, near Chertsey. The casket was placed in the grave which contains the body of the second Lady Brunner, who died in 1910.

It is stated that Mr. C. T. Kingzett, F.I.C., one of the original founders of the Institute of Chemistry, is preparing for early publication by Baillière, Tindall, & Cox (London) an abridged "Popular Chemical Dictionary" in a single volume.

The Board of Trade have issued a general licence authorising the payment of fees in respect of the grant and renewal of patents, and of the registration and renewal of the registration of trade marks and designs in enemy countries or on behalf of enemies.

The body of a messenger named Antoine, who disappeared at Dreux as long ago as 1887, has been discovered by some workmen who were clearing the bottom of the town gasholder. Both the body and the clothes were in a perfect state of preservation, and some notes in a notebook are still legible.

The Surplus Government Property Disposal Board, Ministry of Munitions, in view of the large quantities of chemical material available, has an Explosives and Chemical Section housed at Storey's-gate, Westminster, where chemicals, &c., are for sale, particulars of which will be found in the current issue of *Surplus*, the official organ.

According to *Stubbs Weekly Gazette* the failures in the United Kingdom for the week ended July 5, 1919, were twenty-one, an increase of seven. The number of bills of sale registered and re-registered was 115, an increase of forty-eight. Mortgages and charges registered by limited companies amounted to £1,586,326 the amount authorized (where stated) being £110,600.

The funeral of Lord Rayleigh took place at Terling Church, Witham, on Friday, July 4, in the presence of a large assembly, which included the Vice-Chancellor of Cambridge University and the heads of the colleges. The King was represented by Lord Stanmore, and among others present were Lord Lambourne, the Marquess of Salisbury, Lord Selbourne, Mr. Gerald Balfour, and the Hon. Alfred Lyttelton.

According to *Jordan's Register*, the Manufacturing Confectioners' Alliance (Incorporated) of British Cocoa, Chocolate, Sugar, and Confectionery, and Jam Manufacturers has been registered as a company limited by guarantee to promote the welfare of the British cocoa, chocolate, sugar, confectionery, and jam trades or industries in all matters other than industrial. Among the directors are S. W. Pascall, B. S. Rowntree, and J. Boyd.

The Chemical Employers' Federation has just entered into an affiliation agreement with the Motor Transport Employers' Federation in respect of those of its members who employ commercial motor vehicles. The Motor Transport Employers' Federation is one of the three Employers' organisations represented on the Joint Industrial Council for the Road Transport Industry, of which Council, Captain F .G. Bristow, 83, Pall Mall, London, S.W.1, is the secretary for the employers.

A Swiss Industrial Bureau has been formed at Lausanne. It has four main objects in view—to advertise Swiss industries, heir productions or possibilities of production; to contribute o the re-stablishment of normal economic relations between Switzerland and foreign countries; to develop exportation and exchange with the latter; to encourage collaboration between industrial managers, and to facilitate the creation and introduction of new industries.

The laboratories at the Derby Technical College, which were recently placed in charge of Mr. Yates, M.Sc. (Manchester), B.Sc. (London), F.I.C., who succeeded Dr. Walker, have attracted a full compliment of students, there having been a considerable nflux of men demobilised from the Army during the session. A new addition to the staff is Mr. Reeve, who was educated at University College, London, and was engaged on war work at Manchester. It is contemplated that the syllabus for the session in September will contain a suitable course for partially disabled ex-service men.

A circular has been issued by the Board of Education in regard to the higher education of ex-service students at institutions of lower than university standard. In accordance with the suggestions made, the Birmingham Education Committee is arranging to provide in the main departments of the Municipal Technical School full time day courses in industrial chemistry for such students. The fee payable has been fixed at £20 per session—the course will be open to ordinary students—and in the case of approved ex-service students this will be payable by the Board of Education.

The Scholarships Committee of the Chemists Club of New York announce the offer of the Bloede and the Hoffmann scholarships for the academic year, 1919-20. These scholarships were founded by Dr. Victor G. Bloede of Baltimore, and Mr. William F. Hoffmann of Newark, with the object of giving financial assistance to deserving young men to obtain an education in the field of industrial chemistry or chemical engineering. They are open to properly qualified applicants without restriction as to residence, and are tenable at any institution in the United States designated or approved by the scholarships committee.

Owing to the death of Sir Boverton Redwood, Mr. Arthur W. Eastlake, and Mr. William Sutton, who have been associated with him for the past twenty-eight and twenty-three years respectively, in inspecting and reporting on petroleum properties in all parts of the world, have arranged to enter into partnership for continuing inspection and advice on all matters in connection with the petroleum industry in a similar manner to that undertaken by Sir Boverton. Mr. Robert Redwood has consented to co-operate with them, and to undertake the examination of oil samples, etc. They will also be assisted by Mr. W. H. Dalton in geological matters, and by others previously associated with the late Sir Boverton Redwood.

Indications of an extensive oilfield have been discovered in Cardiganshire, and investigations are being made by Lord Cowdray's geological experts. Paraffin wax, indicating that the peat generates paraffin, has been discovered in the great peat bog at Tregaron. Some years ago this bog was explored by German chemists, who, by distillation, obtained from peat each of the following products: lubricating oil, vegetable naphtha, camphor, ammonia, paraffin wax, and tar. The bog extends to four thousand acres. The Ministry of Munitions propose to get up an Oil Committee, with a peer as chairman, to advise whether oil shall be treated as public or private property, and how it shall be worked to prevent waste.

The Council of the Royal Society of Arts have awarded the Society's Silver Medal for the following papers read before the Society during the past Session:—Edward C. de Segundo, A.M.Inst.C.E., "The Removal of the Residual Fibres from Cotton Seed, and their Value for Non-textile Purposes." Sir Frank Heath, K.C.B., Secretary, Department of Scientific and Industrial Research, "The Government and the Organisation of Scientific Research." Walter Leonard Lorkin, A.M.I.E.E., "Electric Welding and its Applications." W. Norman Boase, C.B.E., "Flax: Cultivation, Preparation, Spinning, and Weaving." Brigadier-General Lord Montagu of Beaulieu, C.S.I., "Aviation as affecting India." Professor John Cunningham McLennan, O.B.E., Ph.D., F.R.S., "Science and Industry in Canada."

Books Received

"Cork: Its Trade and Commerce." Published by the Cork Incorporated Chamber of Commerce and Shipping. (First Issue.)

"Explosives." By E. de Barry Barnett, B.Sc. (Lond.), A.I.C. One in a series of volumes giving a survey of chemical industries, edited by Samuel Rideal, D.Sc. (Lond.), F.I.C. Baillière, Tindall & Cox, London. Pp. 241. 12s. 6d.

"The Chemist's Year Book, 1918-19." Edited by F. W. Atack, M.Sc., &c., assisted by L. Whinyates. An up-to-date compilation of chemical, physico-chemical, mineralogical, and mathematical tables, together with technical methods of analysis Sherratt & Hughes, Manchester. 15s. (2 vols.) 15s. 6d. post free.

References to Current Literature

Only articles of general as distinct from specialised interest are included and given in alphabetical order under each geographical subdivision. By publishing this digest within two or three days of publication or receipt we hope to save our readers time and trouble; in return we invite their suggestions and criticisms. The original journals may be consulted at the Patent Office or Chemical Society's libraries. A list of journals and standard abbreviations used will be published at suitable intervals.

British

ALCOHOL. Power alcohol. Report of Inter-Departmental Committee on the Production and Utilisation of Alcohol for Power Purposes. *Parliamentary Paper, Cmd.* 218, price 2d.

AUSTRALIA. Science and industry in Australia. J. McCall. *J. Roy. Soc. Arts*, July 4, 529-540. Notes and statistics dealing with scientific progress in various industries.

BENZOL. Still plant for the rectification of benzol. *Gas World (Coking Sect.)*, July 5, 16. A description of the plant at Brancepeth Colliery, Durham, working on the Semet-Solvay principle.

COAL. A chemical investigation of banded bituminous coal. F. V. Tidswell and R. V. Wheeler. *J. Chem. Soc.*, June, 619-636. A study of the properties and products of distillation of the constituents of bituminous coal.

COMBUSTION. The propagation of flames in mixtures of acetylene and air. W. Mason and R. V. Wheeler. *J. Chem. Soc.*, June, 578-587. A further interesting contribution to the knowledge of the mechanism of combustion.

FACTORIES. Women in industry. *Engineering*, July 4, 17-18. Editorial notes and comments.

PEACE TREATY. The peace treaty and the by-product coking industry. *Gas World (Coking Sect.)*, July 5, 14-15. Notes on the sections of the Treaty relating to the Saar coalfield, by-products, and dyestuffs.

RAW MATERIALS. Trade products of the British Empire. *Chamber of Comm. J.*, July, Supp. A statistical account of the British Empire as a supplier of foodstuffs and raw materials for British industries.

SULPHURIC ACID. Chemical plant control. The drain test. *Chem. Trade J.*, July 5, 3-4. An account of the tests applied to effluents from sulphuric acid works as a method of control. Sulphuric acid plants new and old. XII. *Gas World (Coking Sect.)*, July 5, 12-13. Notes on the burning of pyrites.

Colonial

ALCOHOL. Alcohol from sulphite waste lyes. R. H. McKee. *Pulp and Paper Mag.*, June 19, 581-582. Experiments indicate that the cost of producing 95 per cent. alcohol should not exceed 10d. per gallon.

INDIA. Report of the Indian Industrial Commission. Superintendent of Govt. Printing, Calcutta. Price 1s. 6d. Report of the Committee which has been sitting for the past two years to report on the possibilities of future industrial development.

PAPER. War uses of pulp and paper. A. G. Durgin. *Pulp and Paper Mag.*, June 19, 578-580. Deals with the use of pulp and paper for making cartridge belts, nitro-cellulose, aeroplane fabrics, and textiles.

French

AMMONIA. Formation of ammonia by means of the electric arc. E. Brisier and A. Baerfuss. *J. Chim. Phys.*, Mai 31, 71-140. An elaborate study of the synthesis of ammonia at reduced pressures by the arc process.

IRON. Reports on products of the metallurgy of iron. Publications of *Revues de Métallurgie*. G. Charpy, pp. 1-42; J. Carlioz, pp. 1-112. Comprehensive reports drawn up to assist in the organisation of French production after the war. Many statistics are included.

American

KINGSPORT. Kingsport, Tennessee, and its chemical industries. *Chem. and Met. Eng.*, June 15, 639-644. Notes on the tar products, tanning, tannin extract, and wood pulp industries.

STEEL. Alloy steels for helmets and armour. J. A. Coyle. *Chem. and Met. Eng.*, June 15, 618-620. A short account of the composition and manufacture of certain steels used in the American Army.

TURPENTINE. The collection and some uses of the oleo-resin of Douglas fir. S. A. Mahood. *Amer. J. Pharm.*, June, 345-349. An interesting account of a product now being used as a substitute for Venice turpentine and Canada balsam.

German

ANALYSIS. Micro-elementary analysis. E. Diepolder. *Chem. Zeit.*, June 14, 353-354. Notes on the estimation of nitrogen, carbon, hydrogen, and halogens.

Estimation of sulphate as barium sulphate. J. M. Kolthoff and E. H. Vogelenzang. *Z. anal. Chem.*, 1910, pt. 2, 49-69. An account of a detailed study of the conditions of precipitation.

EDUCATION. Instruction in chemistry at German Universities. H. Grossmann. *Chem. Zeit.*, June 17, 357-358.

PLANT. Developments in plant for inorganic chemical industries during the war. *Chem. Zeit.*, June 12, 349-350. (See also CHEM. AGE, pp. 17, 45, and 75.)

STEEL. Behaviour of sulphur in the converter. B. Osann. *Stahl u. Eisen*, June 19, 677-678.

SULPHURIC ACID. Mineral acid industries in 1917-1918. K. Reusch. *Chem. Zeit.*, June 17, 358-360. Notes on raw materials and technique of the sulphuric acid industry. (See also CHEM. AGE, p. 75.)

"Mustard Gas"

ONE of the exhibits at the British Scientific Products' Exhibition at the Central Hall, Westminster, which is arousing much public interest, is Sir William Pope's display of "Mustard Gas." Although originally discovered by a Scotsman, "mustard gas" was first used by the German army in 1917, being the product of a tedious and difficult process which had been used by a famous German professor in 1886. In a few months British chemists had evolved a process immensely simpler, which gave a yield of 98 to 99 per cent. of that theoretically possible as against possibly a yield of 40-60 per cent. by the German process. This striking example of British scientific efficiency—which enabled England and her Allies to produce in one day a quantity of mustard gas equal to the monthly production of Germany and her former allies—illustrates the value of science in industry, and it furnishes a reminder, that without the aid of the best scientifically trained chemists and engineers, British manufacturers will be hopelessly handicapped in competition with other nations.

Fellowships in Chemical Science

A NEW branch of the Ramsay Memorial Fund is now being organised in France and England to collect subscriptions for the foundation of Fellowships in Chemical Science, to be tenable by French chemists resident in the United Kingdom. Some £43,000 has already been subscribed to the general fund for the provision of Ramsay Research Fellowships, and the establishment of a Laboratory of Chemical Engineering, and it is now desired to raise another 1,000,000 francs, primarily from British and American residents in France, but also in England, for the execution of the new project, which, it is felt, will knit together more closely the scientific interests of the two countries. The Prince of Wales is the patron of the fund, while the committee includes M. Pichon, the French Minister of Foreign Affairs, Lord Derby, Mr. Wallace, the American Ambassador in Paris, Sir Robert Borden, Mr. Hughes, General Sir David Henderson, and Lord Hardinge. A number of donations have already been promised, including gifts of £100 from Missions attached to the Peace Conference. The headquarters of the Fund are at University College, London.

Patent Literature

Complete information is only obtainable by purchase of the specification, abstracts being rarely sufficient. Where complete specifications are "open to inspection" but not yet published, fuller information will usually be given in order to obviate a personal visit to the Patent Office. The inclusion of foreign patents is under consideration, and this and other improvements in THE CHEMICAL AGE *service will be developed in accordance with the suggestions and requirements of our subscribers. Illustrations and diagrams will be used as far as possible to shorten written descriptions.*

Applications

(June 23 to 28, inclusive).

Acid-proof Cement, Manufacture of Moulded Articles from. 15,909. W. E. Windser-Richards.

Ammonia, Synthesis of. 16,001. Nitrogen Corporation.

Ammonium Nitrate Fertilisers. 16,021. Norsk Hydro-Electrisk, Kraelstofaktieselskab.

Anthranol, Manufacture of. 16,042. A. G. Perkin.

Argentiferous Sulphide Ores, Treatment of. 15,783. F. E. Elmore.

Coke Ovens. 15,803. Koppers Co.

Esters, Manufacture of. 15774-5-6. U.S. Industrial Alcohol Co.

Ethyl Alcohol, Preparation of from Acetaldehyde. 15,877. Compagnie des Produits Chimiques d'Alais et de la Camargue.

Gas Producers. 15,916. A. L. Galusha.

Gold Alloys. 16,133. D. Belais.

Ortho- and Para-isomerides obtained in manufacture of Benzenoid Compounds. 15,819. W. J. Jones and H. Stephen.

Water Gas, Improvements in Manufacture of. 16,311. Alwyne Meade.

(June 30 to July 5, inclusive.)

Carboniferous Material, Utilisation of Low Grade. 16,817. R. W. Lesley.

Cyanamide, Manufacture of. 16,359. A. Duchemin.

Dyeing Textile Fabrics, Apparatus for. 16,684. Weidmann Dyeing Co.

Ethylene Dichloride, Process for Making. 16,488. Union Carbide Co.

Gases, Cooling or Liquefying. 16,774. M. Zack.

Nitration of Vegetable Oils. 16,741. G. H. Howse.

Oxidation Processes. 16,887. S. J. Green and A. S. Langley.

Purifiers for Gasworks. 16,363. G. F. H. Beard and R. & J. Dempster, Ltd.

Pyrometers, Radiation. 16,651. C. E. Foster.

Varnish, Recovery from Waste Micanite. 16,907. H. C. S. de Whalley.

Complete Specifications

127,614. SULPHONATION OF BENZENE. E. Barbet, Sons & Co., 5, Rue de l'Echelle, Paris. (*See illustration.*)

Relates to the sulphonation of benzene by bringing the benzene vapour into contact with sulphuric acid.

In the column special heating plates, wherein heating coils are arranged, are provided for the purpose of maintaining the temperature of the acid liquid at the desired degree. In the sketch M represents a plate provided with bubbling caps, M^1 represents a heating plate, N the central chimney, O and P the overflow passages, S the passages permitting the vapours to pass in an upward direction from the plate M, each of which passages is provided with a bubbling cap S^1, while T indicates the coil of tubing through which a heating medium is circulated for heating the liquid supported by the plate M^1. When desired, the bubbling plates also may be provided with heating coils extending between the rows of caps.

The fuming sulphuric acid is introduced in a continuous manner at the top of the column, preferably after the same is heated to the desired temperature by means of a heater D provided with a coil.

Benzene, whether pure or mixed with petroleum hydrocarbons, is also introduced continuously and at a rate controlled by the cock or valve R, by way of the regenerator B in which it is heated by the heat contained in the sulphonated product which flows out of the lower part of the column.

The benzene then passes through the heater-vaporiser C, wherein it is entirely converted into vapour, in which state it will enter at the bottom of A, rise and pass through the whole of the plates in succession.

In the lowest plate, the benzene will meet acid which will consist almost entirely of phenyl sulphonic acid and will completely saturate this acid. The vapours will then as they get progressively poorer in benzene and consist of a larger proportion of non-sulphonatable products, bubble through acid which will be capable of absorbing benzene with an increasing degree of avidity, and finally on the topmost plate pass through fresh acid of the maximum sulphonating power.

The non-sulphonable vapour of petroleum hydrocarbons will pass through the acid without being absorbed and will then pass through the condenser E, the test glass F, and thence to the continuous purifier H, which is fed with water by the cock or valve L, and retains the acid carried away (particularly a small quantity of sulphurous acid), the petroleum hydrocarbons freed from benzene and in a pure state flowing into the tank K.

The phenylsulphonic acid, which was formed during the gradual descent of the acid from plate to plate, will flow out of the pipe *b*, give back its heat to the entering benzene and finally flow into a tank G, wherein it will be entirely cooled by means of a water-coil.

127,615. CELLULOSE ACETATE COMPOSITIONS. C. Dreyfus, The British Cellulose and Chemical Manufacturing Co., Ltd., 8, Waterloo Place, S.W.

A process for the manufacture of solutions, compositions, or preparations having a basis of acetate, characterised in that lanoline is incorporated with or employed in solutions or plastic masses of any cellulose acetate. Also preparations consisting of solutions or masses of cellulose acetate incorporated containing lanoline, with or without addition of camphor substitutes, triacetine, acetanilide, benzyl alcohol, terpineol or other desired solvents, dyes, pigments, metallic powders or other substances. The application of such solutions, compositions or preparations for the manufacture of varnishes, dopes, spreading or coating solutions or masses, films, sheets, celluloid substitutes or other products.

127,650. ASPHYXIATING GAS, IMPROVED MANUFACTURE OF. E. Sernagiotto, 42, Via Mazzini, Bologne, Italy, and G. Orsi, 32, Via Ovidio, Rome.

A liquid consisting of a concentrated solution of cyanhydric acid in chloroform or in tetra-chloride of carbon or in a mixture of the two substances, and used in projectiles suitable for dropping from aerial machines, the liquid being adapted to create invisible asphyxiating gases which are heavier than air and slowly diffusible.

127,652. CONCENTRATION OF SULPHURIC ACID AND OTHER LIQUIDS. J. S. Morgan, Borrowdale, Freshfield. (*See illustration.*)

Apparatus for concentrating sulphuric acid and other liquids, in towers or chambers, having a series of basins wherein the acids are caused to take a circuitous course with alternate freely dropping through the gases until they reach the bottom and at the same time air and gases such as products of combustion at considerable heat are passed up the tower or chamber and past the under surface of each basin, one or more sides of the tower being formed of fixed but movable plates so that any broken basin or its supports can be replaced without touching the others.

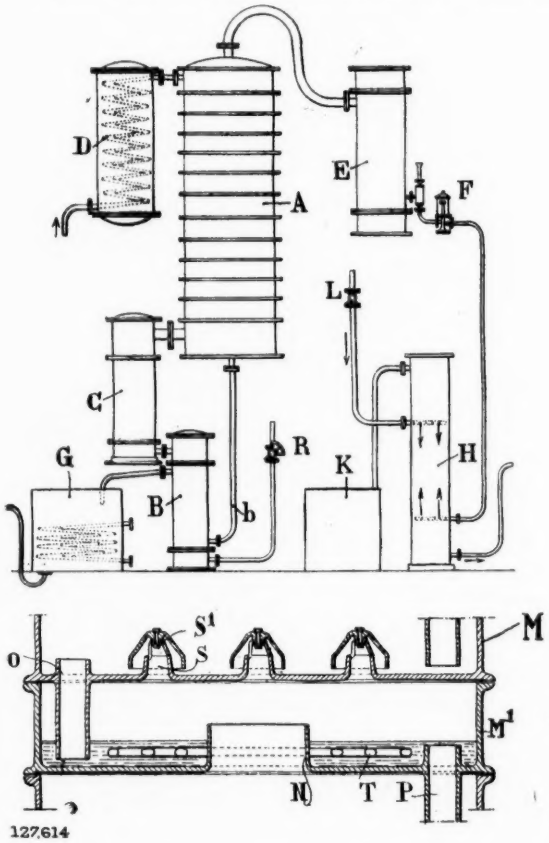
127,664. IMPROVEMENTS RELATING TO IMPREGNATING AND COATING METALS WITH OTHER METALS. A. C. Hyde, Perivale Lodge, Perivale, Ealing, W.; A. Jude, and Belliss & Morcom, Ltd., Ledsam Street Works, Birmingham.

A process for the production of impregnated metal, in which a core of metal or alloy of relatively high melting point is enclosed within a metal or alloy of greater fusibility, and then subjected to a temperature at or just above the fusing temperature of the clothing metal or alloy in an atmosphere of hydrogen or carbon

monoxide or mixture thereof, with or without inert gas, for a time sufficient to enable the clothing metal or alloy to impregnate the core throughout its entire volume. Also a modification of the above process in which the clothing metal or alloy does not completely enclose the core metal, but is applied to one or more faces only. Also a process for the production of an article of composite metal, in which a metal or alloy of relatively high melting point is not enclosed by but is coated on one or more sides only with a metal or alloy of greater fusibility, and is then subjected to a temperature at or just above the fusing temperature of the more fusible metal, in an atmosphere of hydrogen or carbon monoxide or mixture thereof and the resulting composite metal is then finally subjected to a drawing or other equivalent mechanical operation.

127,677. Glauber's Salt and Sulphuric Acid Solutions, Production of from Nitre Cake. H. M. Dawson, 23, Claremont Drive, Headingley, Leeds.

A process for the production of Glauber's salt and sulphuric acid solutions from nitre cake or other acid sodium sulphates by dissolving these substances in water to produce liquors the concentration of which is predetermined exactly by the composition of the acid sodium sulphate and by the degree of cooling to which the liquors are to be subjected, the liquors being subsequently cooled below about 0° C., whereby the products obtained consist of Glauber's salt and a solution having the maximum ratio of sulphuric acid to sodium sulphate.



127,614

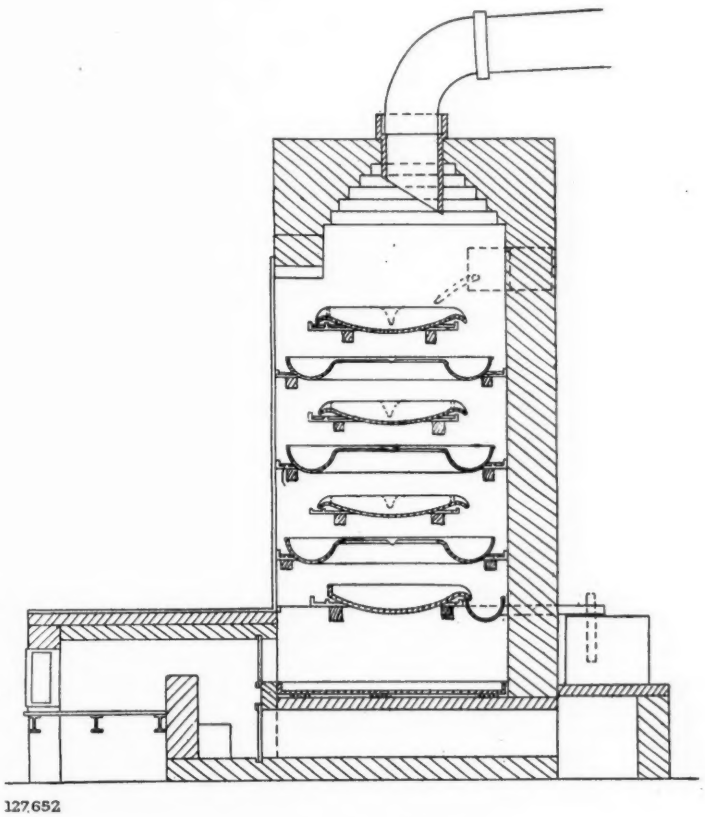
127,683. Natural Colour Effects. H. Soar, 4, Cross Road, Bowes Road, New Southgate.

The use for photographic, optical, or ornamenting purposes of the photo-chromatic effects of light on layers of solutions held on a suitable supporting medium, such as glass plate.

127,700. Continuation, Dehydration, and Distillation of Tar. Thos. Owston Wilton (the Chemical Engineering and Wilton's Patent Furnace Co., Ltd.), Hendon, London.

The tar to be dehydrated and distilled is subjected in succession to a plurality of steps, each step comprising heating it under pressure supplied by pumps in a coil or coils, and suddenly releasing this pressure in an expansion chamber or chambers, to liberate constituents volatile at the temperature of the expansion chamber or chambers of the given step, the tar or liquid from the first step passing on through the coil or coils and expansion chamber or chambers of the second step for the volatilisation and liberation of a succeeding portion or fraction of its constituents, and so for any required number of steps. For the dehydration and distillation of coal tar two such steps of heating under pressure and releasing from pressure may suffice, followed, if desired, by the distillation of the remaining residue with steam, to remove anthracene, and leaving the pitch for collection.

In dehydrating and distilling coal tar, the tar may be pumped, under a pressure of 30 lb. to 50 lb. per sq. in., through a coil heated to such a temperature that on issuing from the coil into an expansion chamber the water and light coils are liberated in form of vapours and can be led away for condensation, the tar then passing on to a second coil and thence into a second expansion chamber, the second coil being heated to a temperature of approximately 230°-300° C. to effect the liberation of creosote vapours in the corresponding chamber, when the tar enters same, whilst these vapours can be led away for condensation. The residue from the second expansion chamber may be led to a mixing chamber or apparatus which is maintained at a temperature of about 300° C., and which is supplied with steam at that temperature, where tar is subjected to steam distillation to extract the anthracene, or it might be pumped through a third coil or expansion chamber before this last steam treatment.


127,652

127,740. Amines, Preparation of. W. Rintoul, J. Thomas, and Nobels Explosives Co., Ltd., Ardeer Factory, Stevenston, Ayrshire

In the preparation of amines, utilising the selective reaction of the ethyl chlorformate with primary and secondary amines whereby the said amines form the corresponding urethanes, while tertiary amines are unacted upon. Also in preparation of amines treating a mixture of secondary and tertiary amines; or primary and tertiary amines; or a mixture of all three bases with ethyl-

chlorformate, the primary and secondary amines present reacting to form urethanes, which, being neutral bodies, do not combine with acids, and can therefore be freed from admixed tertiary base by washing with dilute mineral acid.

127,766. Decolorised, Odourless, and Tasteless Albumins from Blood. A. J. L. Terwen, 22m, Aaksen, Weimarlaan, and C. J. Christiaan van Hoogenhuyze, 8, Banstraat, Amsterdam, Holland.

The manufacture of decolorised, odourless, and tasteless albumins from blood by first treating the blood for a considerable time with diluted acid, then adding hydrogen peroxide, and only after a considerable time neutralising the acid, whereupon the liquid is heated and the decolorisation completed.

127,770. Manufacture of Lamp Black. E. L. Curbishley, Wood Lea, Albert Road, Cheadle Hulme, Chester.

An improved process of manufacturing carbon lamp black, consisting in first placing the material in an enclosed mixer, adding water to it until it assumes a plastic state, at which point is added from 2 to 5 per cent. of resin oil or thereabouts, and finally placing it in a stove under heat until all the water used in the mixing is evaporated, and the oil is left to form a binding medium for the minute particles of the material

127,775. Artificial Fuels. J. E. Taylor, 296-302, High Holborn. Fuel composed of earth, loam, or clay impregnated with a solution of potash or common washing soda, the residue of the pericarp of the palm or other like oil-bearing trees after the oil has been extracted therefrom, the shells of the palm or other like nuts, and coal dust, charcoal, or other carbonaceous matter.

Shares in Rumanian Companies

The Rumanian Legation in London notify that the previous notice on the subject of shares held by foreigners in Rumanian companies is cancelled and replaced by the following :—

Persons and companies domiciled in the United Kingdom, who hold shares in companies incorporated under Rumanian Law, which on and after August 28, 1916, have been sequestered or placed under the control of the Rumanian Government are hereby notified that, in order to comply with the provisions of the Decree-Law of the Kingdom of Rumania, No. 1,353, of March 29, 1919, and the decision of the Department of Industry and Commerce of the Rumanian Government, No. 5,452, of March 5, 1919, they must within ten days from July 8 present their share certificates in such companies to the Rumanian Legation, 4, Cromwell Place, London, S.W. 7, for the purpose of being vised and stamped.

In the case of shares which were held by the present owner prior to August 28, 1916, proof must be produced in support of this. With regard to the securities which have been transferred or negotiated since August 28, 1916, proof must be given that on that date they were not held by or for account of subjects of countries with which Rumania has been at war nor in the meantime have been so held. The share certificates must be accompanied by a schedule in triplicate, giving the numbers and denomination of the shares held.

Home-Produced Motor Spirit

To further a campaign to encourage the production of home-produced motor spirit, the Gaumont Company, under the direction of the Fuel Department of the Automobile Association, has made a film which illustrates how wasteful is the practice of using coal in its raw condition. The film can be exhibited in ten minutes, and it is hoped that during the coming months it will be shown in the many cinema theatres of the country. Audiences will learn by this form of propaganda that 70 per cent. of the heat in coal is lost in the usual open domestic grate and that there is waste up to 48 per cent. in the hand firing of boilers. Pictures are shown of a factory chimney belching forth smoke which dissipates in the air very valuable by-products, and then there is a demonstration of the quantities of these products which can be obtained from one ton of coal. For instance, 2½ gallons of benzol, the product of one ton of coal, is enough to drive a motor-lorry 20 miles, a motor-car 40 miles, and a bicycle with side-car 150 miles.

Stocks and Shares

Commercial, Industrial, &c.

	Quotations July 9	Jul 2
Alby United Carbide Factories, Lim., Ord.	1 1/16–1 1/16	1–1 1/8
Associated Portland Cement Manufrs. (1900) Lim., Ord.	7 7/8–8 1/8	7 15/16–8 3/16
Bell's United Asbestos Co., Lim., Ord.	2–2 1/4	2 1/4–2 3/8
Bleachers' Association, Lim., Ord.	1 1/4–1 5/16 xd	1 1/4–1 15/16
Borax Consolidated, Lim., Prefd. Ord.	4 1/8–4 5/8	4 1/4–4 5/8
Bradford Dyers' Assoc. Lim., Ord.	2 1/8–2 1/4	2 3/16–2 5/16
British Aluminium Co., Lim., Ord.	1 31/16–1 13/16	1 31/16–1 13/16
British Oil and Cake Mills, Lim., Ord.	1 7/8–2	1 7/8–2
British Portland Cement Manufrs., Lim., Ord.	33/6–35/6	34/0–36/0
Brunner, Mond & Co., Lim., Ord.	1 7/8–2xd	1 7/8–2
Castner-Kellner Alkali Co., Lim.	2 5/8–2 7/8	2 5/8–2 7/8
China Clay Corporation, Lim., Ord.	1/4–3/8	1/4–3/8
Cook (Edward) & Co., Lim., 4% 1st Mort. Deb. Stock Red.	57–61xd	57–61
Courtaulds, Lim.	10 1/4–10 3/4	10 1/4–10 3/4
Crosfield (Joseph) & Sons, Lim., Cum. 6% Prefce.	7/8–1 1/4xd	.. ..
Curtis's & Harvey, Lim.	2 9/16–2 13/16	7/8–1 1/8
Explosives Trades, Lim., Ord.	21/9–22/0xd	20/6–21/6
Field (J. C. & J.), Lim., Ord.	7/16–9/16	7/16–9/16
Greenwich Inlaid Linoleum (Fredk Walton's New Patents) Co., Lim., Ord.	1/2–5/8	1/2–5/8
Harrison & Crosfield, Lim., 10% Cum. Prefd. Ord.	1 11/32–1 15/32	1 11/32–1 15/32
India Rubber, Gutta Percha and Tel. Wks. Co., Lim., Ord.	17 1/4–17 3/4 d	17 1/4–17 3/4
Lawes' Chemical Manure Co., Lim., Ord.	6–6 1/2	6–6 1/2
Lever Bros., Lim., 6 % Cum. "A" Prefce.	19/ –19/6	19/3–19/9
Do. 6½ % Cum. "B" Prefce.	20/3–20/9	20/9–21/3
Magadi Soda Co., Lim., Ord.	1 3/32–1 7/32	1 3/32–1 7/32
Manganese Bronze and Brass Co., Lim., Ord.	11/16–13/16	11/16–13/16
Maypole Dairy Co., Lim., Defd. Ord.	1 9/32–1 11/32	1 5/16–1 1/4
Mond Nickel Co., Lim., 7% Cum. Pref.	1 1/8–1 1/4	1 1/4–1 1/4
Do. 7% Non. Cum. Pref.	15/16–1 1/16	15/16–1 1/16
Pacific Phosphate Co., Lim., Ord.	5 1/8–5 3/8	5–5 1/4
Power-Gas Corporation, Lim., Ord.	3/4–7/8	3/4–7/8
Price's Patent Candle Co., Lim.	38–40	39–41
Salt Union, Lim., Ord.	1 1/4–1 3/8	1 1/4–1 3/8
United Alkali Co., Lim., Ord.	1 5/16–1 9/16	1 5/16–1 9/16
Val de Travers Asphalte Paving Co., Lim.	15/16–1 1/16	15/16–1 1/16
Van den Berghs, Lim., Ord.	3 1/4–3 1/2	3 5/8–3 7/8
Walkers, Parker & Co., Lim.	1 1/16–1 3/16	1 1/16–1 3/16
Welsbach Light Co., Lim.	2 1/2–2 3/4	2 3/4–3

Gas, Iron, Coal and Steel.

Gas Light and Coke Co., Ordinary Stock (4% Stand.)	57–59	57–59
South Metropolitan Gas Co., Ordinary (4% Stand.)	58–60	59–61
Ebbw Vale Steel, Iron & Coal Co., Lim., Ord.	27/9–28/9	28/6–29/6
Hadfield's, Limited, Ordinary	2–2 1/16	2 1/32–2 3/32
Staveley Coal & Iron Co., Lim., Ord.	1 3/8–1 7/8	1 3/8–1 7/8
Vickers, Limited, Ordinary	35/6–36/6	36/6–37/6
Armstrong (Sir W. G.) Whitworth, Ltd., Ord.	34/6–35/6	36/3–37/3

Mines, Nitrate, &c.

Rio Tinto Co., Lim., Ord. (Bearer)	59–61	58–60
Antofagasta Nitrate Co. Compañia de Salitres de Antofagasta) 5½% 1st. Mt. Debs. Red.	88–93	91–96
Lagunas Nitrate Co., Lim.	1 1/8–1 3/8 xd	1 1/4–1 1/2
Tarapaca and Tocopilla Nitrate Co., Lim.	14/0–16/0	15/0–17/0
Anglo-Chilian Nitrate and Rly. Co., Ltd., Ord.	14–15	14 1/2–15 1/2

Oil and Rubber.

Anglo-Persian Oil Co., Lim., Cum. 6 % Part.	1 5/16–1 3/8	1 5/16–1 3/8
Mexican Eagle Oil Co., Lim. (Cia Mexicana de Pet. "El Aguila" S.A.) (Bearer Non. Cum.)	8 7/16–8 9/16	7 7/8–8
"Shell" Transport and Trading Co., Lim., Ord.	8 3/16–8 5/16	10 3/8–10 5/16
Do. 5% Cum. Pref.	9–9 1/4	9–9 1/4
Anglo-Java Rubber & Produce Co., Lim.	5/9–6/3	6/3–6/9
Anglo-Malay Rubber Co., Lim.	13/0–13/6	13/1 1/2–13/7 1/2
Chersonese (F.M.S.) Estates, Lim.	3/9–4/0xd	3/9–4/0
Linggi Plantations, Lim., Ord.	.. ..	.. ..
Anglo-Maikop Corporation, Ltd., Ord.	6/9–7/9	6/9–7/9
Burmah Oil Co., Ltd., Ord	12 3/8–12 3/8	11 5/16–11 7/16

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. Only commodities whose values are at the time of particular interest or of a fluctuating nature are included in our weekly report. A more complete list and report, including a Continental and American report, appears in the first issue of each month, and will include prices of plant supplies, building materials, structural steel, fuels, glues, ores, refractories, metals, minerals, and miscellaneous materials, as soon as the necessary arrangements are completed. Last week's report contained some of these items. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report. Suggestions and criticisms in regard to these pages will be welcomed.*

Market Report

THURSDAY, July 10, 1919.

BUSINESS has been fairly active this week, the Paint and Colour, and Tanning industries in particular. The trouble in the Cotton Trade has, however, had a disturbing influence on transactions in the Textile district and only restricted buying is in evidence. There are signs, however, that wiser counsels may soon prevail, and the means found to effect a settlement. The export demand is quite encouraging and as American offers are not now so pressing and shipping facilities appear to be more difficult from the States, a certain amount of business has been placed in this country which might otherwise have gone to America.

General Chemicals

ACID ACETIC.—Slightly higher prices are already being quoted from America. The production for July—August is practically sold.

ACID BORACIC.—The scarcity may exist for some time, as makers experience difficulty in coping with the active demand.

ACID CARBOLIC.—In consequence of large orders received from abroad—notably Japan—English makers are now holding out for 6d. per lb. for 39–40 deg. Several contracts for home-trade were booked last week at 5½d. The prospects being much brighter, we would not be surprised to hear of a further improvement before long.

ACID SALICYLIC.—A welcome change for the better has at last set in, and the principal English makers have raised their quotations 3d. to 4d. per lb. Their productions are well sold for July–August.

ARSENIC.—Business has been somewhat brisker during the past week, and a sharp recovery in price has taken place. There are several important enquiries for export which cannot be handled at present, owing to insufficient supplies.

BARIUM CHLORIDE.—As the colour trade is now settling down, we may expect a revival in the demand for this precipitant. There has been a little more activity in this material, and the prices remain steady at last quoted figures.

BLEACHING POWDER.—Stocks are moving off very slowly, but prices remain unaltered.

CARBON TETRACHLORIDE.—Considerable quantities appear to be available in England and America, and consumers are afforded an opportunity to secure supplies on favourable terms.

CASEIN.—In anticipation of the heavy demand which is expected from the Central Empires, prices remain firm, and may be raised again at any moment.

COPPER SULPHATE.—Only a small business has been transacted and the market is without feature.

LEAD ACETATE.—The price is slightly weaker, but it would seem that we are now rapidly approaching the bottom level for the time being.

LEAD CARBONATE.—An important business has taken place for delivery over the second half of this year, and manufacturers find it difficult to keep pace with the continually increasing demand.

PHOSPHATE OF SODA.—This material is in fair demand and the price is slightly higher, and with the present cost of raw material it would not be surprising to see the market further stiffen.

POTASH CARBONATE.—Sales are mainly confined to spot parcels for which good prices are still being realised.

POTASH PRUSSIATE.—Licences to import this product are being sparingly granted, and English makers are firmly maintaining their prices.

SAL AMMONIAC.—Owing to the large number of orders recently placed, makers are now practically sold through to October.

SODA CAUSTIC.—The position remains unchanged. Competition for export orders is still very active.

SODA NITRATE.—Supplies are coming forward again from Norway, the strike being at an end.

SODA SULPHIDE.—Consumption is expected to increase from now onwards. Present prices appear to be quite acceptable to manufacturers.

Heavy Coal Tar Products

There is still a good enquiry for most of the products, but business is very irregular, largely owing to the difficulties brought about through the political position and the impossibility of transport. It is evident it will take a long time to arrive at normal market conditions.

BENZOL.—Further business has been done at 1s. 9d. to 1s. 10d. per gallon for export, and the Home demand remains fairly good.

CREOSOTE is unchanged.

CRESYLIC ACID.—Rather more business has been done at lower prices, and the values to-day are 2s. 4½d. to 2s. 6d. per gallon, f.o.b., in barrels.

NAPHTHALENE.—There is not so much pressure to sell, and refined can no longer be bought at £13 per ton. The quotation to-day is £15 to £16 per ton, while there is no change in the prices of crude.

SOLVENT NAPHTHA.—There is rather more enquiry, and business is being done at 1s. 9d. to 2s. in the North, and from 2s. 1d. to 2s. 3d. in the London District.

PITCH.—The market is active, and business has been done at 65s. f.o.b. East Coast and 72s. 6d. f.o.b. London.

Sulphate of Ammonia

The demand for export continues to be good, and it is evident that the surplus available for export will be readily taken up.

There is no change in the Home Trade prices of £17 and £19 per ton, for delivery up to the end of September.

Coal Tar Intermediates

The market generally shows firmness all round, and, with the exception of the lower price quoted for resorcin, there are no changes of importance to notify.

ALPHA NAPHTHOL.—There is more interest being taken in this material and one or two fair-sized orders have been placed at last quoted figures.

ANILINE OIL.—A good demand still continues, and, with the reopening of certain export markets, a more active business is anticipated.

ALPHANAPHTHOL.—The production of this intermediate in this country is still apparently far below the requirements of the dye-makers. So far, there have been no large imports from America to augment the available supplies.

ANTHRACENE.—We understand that a high-class product, testing about 20 per cent. is about to be placed on the market. We expect to be able to give full particulars in our next issue.

ANTHRANILIC ACID.—The American makers anticipate shortly

being able to quote more favourable prices for this intermediate.

BETA NAPHTHOL.—Trade is better in this material and prices steady at last quoted figures.

TECHNICAL RESORCIN.—Shows a considerable reduction in price, which is due to the largely increased output.

Current Prices

Chemicals.

July 3, 1919.

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	3	6	to	0	3	9
Acetone, pure	ton	95	0	0	to	97	0	0
Acid, Acetic, glacial, 99-100%	ton	77	10	0	to	80	0	0
Acetic, 80% pure	ton	62	10	0	to	65	0	0
Carbolic, crystal, 39-40%	lb.	0	0	5¾	to	0	0	6
Citric	lb.	0	4	4	to	0	4	5
Lactic, 50% vol.	ton	70	0	0	to	72	10	0
Lactic, 60% vol.	ton	85	0	0	to	87	10	0
Oxalic	lb.	0	1	2½	to	0	1	3
Pyrogallic cryst.	lb.	0	10	3	to	0	10	6
Tannic, coml.	lb.	0	2	9	to	0	3	0
Tartaric	lb.	0	3	3	to	0	3	4
Alum, lump	ton	17	10	0	to	17	15	0
Aluminium sulphate, 14-15%	ton	13	10	0	to	14	0	0
Aluminium sulphate, 17-18%	ton	17	0	0	to	17	10	0
Ammonia, anhydrous	lb.	0	1	8	to	0	1	9
.880	ton	32	10	0	to	37	10	0
Carbonate	lb.	0	0	6½				
Muriate	ton	48	0	0	to	50	0	0
Nitrate	ton	55	0	0	to	57	10	0
Phosphate	ton	110	0	0				
Arsenic, white 99-100%	ton	38	0	0	to	39	0	0
Barium, Carbonate, 92-94%	ton	11	0	0	to	12	0	0
Chloride	ton	27	0	0	to	27	10	0
Nitrate	ton	51	0	0	to	52	0	0
Sulphate (blanc fixe), dry	ton	25	10	0	to	26	0	0
Sulphate (blanc fixe), pulp	ton	15	10	0	to	16	0	0
Bleaching powder, 35-37%	ton	13	10	0	to	14	0	0
Borax crystals	ton	44	0	0	to	45	0	0
Calcium acetate, grey	ton	16	0	0	to	16	10	0
Calcium chloride	ton	8	10	0	to	9	0	0
Casein, technical	ton	82	0	0	to	85	0	0
Cobalt oxide, black	lb.	0	7	9	to	0	8	0
Copper sulphate	ton	45	0	0	to	47	0	0
Cream Tartar, 98-100%	ton	235	0	0	to	249	0	0
Epsom Salts (see Magnesium Sulphate).								
Iron, perchloride	ton	32	0	0	to	34	0	0
Sulphate (copperas)	ton	4	15	0	to	4	17	6
Lead, Acetate, white	ton	82	10	0	to	85	0	0
Carbonate (White Lead)	ton	51	0	0	to	55	0	0
Nitrate	ton	58	0	0	to	59	0	0
Lithopone, 30%	ton	42	0	0	to	43	0	0
Magnesium, Chloride	ton	15	0	0	to	16	0	0
Carbonate, light	cwt.	3	0	0	to	3	5	0
Sulphate (Epsom salts, coml.)	ton	11	10	0	to	12	10	0
Magnesium Sulphate (druggist's)	ton	17	0	0	to	18	0	0
Methyl Acetone	ton	89	0	0	to	90	0	0
Methyl Alcohol, 1% Acetone	gall.	0	9	0	to	0	9	6
Potassium, Bichromate	lb.	0	1	6	to	0	1	7
Carbonate, 90%	ton	90	0	0	to	92	10	0
Chlorate	lb.	0	1	2	to	0	1	3
Metabisulphite, 50-52%	ton	200	0	0	to	205	0	0
Nitrate refined	ton	58	0	0	to	60	0	0
Permanganate	lb.	0	3	6	to	0	3	9
Prussiate, yellow	lb.	0	1	9	to	0	1	10
Prussiate, red	lb.	0	6	0	to	0	6	3
Sulphate	ton	37	10	0	to	40	0	0
Sal. Ammoniac, firsts	cwt.	4	0	0				
Sal. Ammoniac, seconds	cwt.	3	15	0				
Sodium, Acetate	ton	55	0	0	to	57	10	0
Arseniate, 45%	ton	47	0	0	to	47	10	0
Bicarbonate	ton	9	0	0	to	9	10	0
Bisulphite, 60-62%	ton	30	10	0	to	32	0	0
Chlorate	lb.	0	0	8	to	0	0	8¼
Caustic, 70%	ton	19	0	0	to	19	10	0
Caustic, 76%	ton	23	0	0	to	23	10	0
Hyposulphite, coml.	ton	17	0	0	to	17	10	0
Nitrite, 96-98%	ton	58	10	0	to	60	0	0
Phosphate cryst.	ton	25	0	0	to	25	10	0
Prussiate	lb.	0	0	8	to	0	0	8¼
Sulphide, cryst.	ton	15	10	0	to	16	0	0
Sulphide, solid, 60-62%	ton	22	10	0	to	24	0	0
Sulphite, cryst.	ton	11	0	0	to	11	10	0
Strontium, Carbonate	ton							
,, Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur, chloride	ton	38	0	0	to	40	0	0
Tetrachlorethane (Westron)	ton	60	0	0	to	65	0	0
Tin perchloride, 33%	lb.	0	2	4	to	0	2	5
Trichlorethylene (Westrosol)	ton	75	0	0	to	80	0	0
Protochloride (tin crystals)	lb.	0	1	8	to	0	1	9
Zinc, chloride, 102 Tw.	ton	22	0	0	to	23	0	0
Chloride, solid, 96-98%	ton	60	0	0	to	62	10	0
Sulphate	ton	21	10	0	to	23	0	0
Oxide, Redseal	ton	80	0	0	to	85	0	0

Coal Tar Intermediates, &c.

	per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	3	0	to	0	3	6
Alphanaphthol, refined	lb.	0	3	6	to	0	3	9
Alphanaphthylamine	lb.	0	2	6	to	0	2	9
Aniline oil, drums free	lb.	0	1	2	to	0	1	3
Aniline salts	lb.	0	1	3½	to	0	1	4
Anthracene, 80%	lb.	0	2	6	to	0	2	9
Benzaldehyde (free of chlorine)	lb.	0	9	0	to	0	9	6
Benzidine, base	lb.	0	5	6	to	0	6	0
Benzidine, sulphate	lb.	0	4	9	to	0	5	0
Benzoic, acid	lb.	0	5	0	to	0	5	3
Benzoate of soda	lb.	0	5	0	to	0	5	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	1	6	0	to	1	7	6
Betanaphthol	lb.	0	2	3	to	0	2	6
Betanaphthylamine, technical	lb.	0	6	6	to	0	7	0
Dichlorbenzol	lb.	0	0	5	to	0	0	6
Diethylaniline	lb.	0	7	0	to	0	8	0
Dinitrobenzol	lb.	0	1	4	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	2	to	0	1	3
Dinitronaphthaline	lb.	0	2	0	to	0	2	3
Dinitrotoluol	lb.	0	1	10	to	0	2	0
Dinitrophenol	lb.	0	1	10	to	0	2	0
Dimethylaniline	lb.	0	2	9	to	0	3	0
Diphenylamine	lb.	0	3	0	to	0	3	3
H-Acid	lb.	0	7	6	to	0	8	0
Metaphenylenediamine	lb.	0	4	6	to	0	4	9
Monochlorbenzol	lb.	0	0	9	to	0	0	10
Naphthionic acid, crude	lb.	0	3	6	to	0	3	9
Naphthylamin-di-sulphonic acid	lb.	0	4	6	to	0	5	0
Nitronaphthaline	lb.	0	1	2	to	0	1	6
Nitrotoluol	lb.	0	1	3	to	0	1	6
Orthoamidophenol	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	3
Orthotoluidine	lb.	0	2	0	to	0	2	3
Orthonitrotoluol	lb.	0	1	6	to	0	1	9
Para-amidophenol, base	lb.	0	14	0	to	0	15	0
Para-amidophenol, hydrochlor.	lb.	0	15	6	to	0	16	0
Paradichlorbenzol	lb.	0	0	4	to	0	0	5
Paranitraniline	lb.	0	4	0	to	0	4	6
Paranitrotoluol	lb.	0	5	3	to	0	5	6
Paraphenylenediamine, distilled	lb.	0	15	0	to	0	16	0
Paratoluidine	lb.	0	7	0	to	0	7	6
Phthalic, anhydride	lb.	0	14	0	to	0	15	0
Resorcin, technical	lb.	0	15	0	to	0	16	0
Resorcin, pure	lb.	0	17	6	to	1	0	0
Salicylic acid	lb.	0	9	10	to	0	2	0
Salol	lb.	0	4	3	to	0	4	9
Sulphanilic acid, crude	lb.	0	1	0	to	0	1	3
Toluidine, base	lb.	0	9	0	to	0	10	0
Toluidine, mixture	lb.	0	2	9	to	0	3	0

Technical Library for Manchester.

The movement in Manchester for securing a Technical Library, towards which a deputation has asked the Minister of Education to consider a claim on the funds of the Committee for Scientific and Industrial Research, has been supported by the Society of Chemical Industry, the Textile Institute, the Chemical Club, and the Society of Dyers and Colourists. It is intended that in part the library shall be supported from the library rate. One of the pleas by which the claim is supported is that in America technical libraries are established in the principal industrial cities, and not only in the capital, as in this country. The promoters of the Technical Library for Manchester urge that industrial centres should have all assistance in promoting the progress of technical industries and stimulating invention. In this matter they claim, we are far behind, not only America, but some other countries.

A deputation from Manchester waited last week upon Mr. H. A. L. Fisher (President of the Board of Education and Vice-President of the Committee for Scientific and Industrial Research) to present to him the claims of Manchester for assistance from the sum of £1,000,000 recently allocated for industrial research. Mr. Fisher promised to give the matter his most favourable consideration.

Company News

ASSAM OIL.—The profit for 1918 was £85,849. After payment of dividends for 1917, the balance brought forward amounted to £38,052, making a total amount at credit of £123,901. Out of this sum the excess profits tax for 1915, 1916 and 1917, and the interim and final dividends on the preference shares were paid. The directors have transferred £25,000 to depreciation account, and propose to pay a dividend of 8 per cent. on the ordinary shares and a further 1 per cent. on the preference shares, in order to make their total dividend equal to that paid on the ordinary shares, both less tax; leaving a balance of £28,322 to carry forward, out of which the excess profits in respect of the 1918 accounts will be paid. For 1917 the dividends were the same.

BATU CAVES RUBBER.—Dividend of 20 per cent. (4s. per share), less income tax (interim), paid July 1. Last year, 25 per cent.

BERENGUELA TIN MINES.—Interim dividend of 7½ per cent. (less tax) for the year ended June 30, payable on July 28.

BRITISH MALAY RUBBER.—It is reported that the Planter's Association of Malaya, in spite of war conditions, the voluntary restriction of output adopted by many of the companies, and the difficulty of marketing the product owing to lack of shipping, the rubber production of the whole of the Malay Peninsula in 1918 amounted to 133,364 tons, an increase of 3 per cent. over the previous year. The total world's production of plantation rubber in 1918 is computed at 208,000 tons, against 218,000 tons in 1917. The output of British Malaya has increased from 3,340 tons in 1919 to 133,364 tons in 1918. The total shipments are returned at 127,052 tons. The largely increased quantities of rubber sold under contract in Singapore induced the Singapore Chamber of Commerce Rubber Association to establish a Standard Qualities Committee, on similar lines to the Committee in London, to examine and pass samples of all contract rubber sold there, and it is expected that this innovation will ensure standards of quality on the Singapore market, being the same as in London and so facilitate business. The establishment of a Rubber Exchange in Singapore is also contemplated.

CANADIAN EXPLOSIVES.—Dividend of 1¾ per cent. on the 7 per cent. cumulative preferred shares for the qrtr. ended June 30, payable July 15.

CHOTA RUBBER ESTATES.—The net profits for 1918, after writing off £581 for depreciation and reserving £656 for income-tax, amounted to £3,434, against £13,742. The directors propose to pay a dividend of 5 per cent. for the year (against 10 per cent.), to transfer to reserve account £2,000 (against £3,000), and to carry forward, subject to estate staff bonus and to excess profits duty, £1,386 (against £6,794).

CONSOLIDATED MALAY RUBBER ESTATES.—The net profits for 1918 were £18,472, against £44,064. It is proposed to pay a dividend of 3d. per share (12½ per cent.), against 6d. per share (25 per cent.), payable on July 12, less tax; to write off £3,100, against £3,500 to development account; £1,500 to income tax reserve; and to carry forward £5,297, against £10 295.

CONSOLIDATED RUBBER OF BALATA.—At the annual meeting reference was made to the burden of the Excess Profits Duty and to the small quantity of rubber produced owing to leaf disease. This disease it was stated, was becoming very serious and a number of more or less experimental plantations had been closed down. The meeting declared a dividend on the preference shares, less income tax, of 7 per cent., and a dividend of 4 per cent. to the holders of dividend funding warrant certificates.

CROMPTON & CO., LTD.—At the annual meeting a resolution was passed, confirming the provisional agreement with Sir W. G. Armstrong, Whitworth & Co., Ltd. Last February the shareholders sanctioned an increase in the registered capital of the company from £221,007 to £500,000.. Of the new shares, 24,000 were to be preference shares and to be reserved for employees; the remaining 254,993 to be £1 ordinary shares. Sir W. G. Armstrong, Whitworth & Co., Ltd., offered to subscribe for 250,000 of these ordinary shares at par, on the condition that two of their directors—Mr. Saxton Noble and Sir Glynn H. West—should be elected to the Crompton board. Being convinced that the offer was a favourable one for the company, the directors recommended the shareholders to accept it.

DOMINION STEEL CORPORATION.—Dividend No. 30 at rate of 1½ per cent. on preference shares, payable on August 1.

ESPERANZA COPPER AND SULPHUR.—For year to December 31 last, the output of pyrites was 62,720 tons, being 23,913 tons less than in the previous year. Sixty tons of copper precipitate were produced, or 44 tons less than in the previous year. The power plant ran satisfactorily throughout the year, although the cost per unit of power produced was very high, owing to the high price of coal and all materials. 54,719 tons of pyrites were dispatched from the mine to Huelva, being 38,539 tons less than in 1917. The shipments at Huelva were 67,546 tons, being 11,732 tons less than in the previous year. Practically all the markets for pyrites were closed, except that of the United Kingdom, which was under the strictest Government control. Profit for year, £4,761 and £17,897 was brought in, making £22,658. Deduct dividend of 5 per cent. paid August 17, 1918, £17,500; balance, £5,158, which is carried forward. During the year an opportunity arose of acquiring a small copper extraction works at Stockton-on-Tees on favourable terms. These works have since been put in operation. The bulk of the shareholding of New Lymdi, Ltd., has been acquired by purchase. The property is situated in Cyprus, and is held on lease from the British Government. A considerable tonnage of low-grade copper ore has been proved, and it is proposed to develop and exploit same to the best advantage as soon as possible.

LOBITOS OILFIELDS.—At the annual meeting it was reported that the net profit for 1918 was £74,567, against £24,646 in the previous year. The Board proposed an increased dividend, and this, with the transferred shares in the Anglo-Ecuadorian Oilfields (the chairman hoped) would prove satisfactory to the shareholders.

MALAYALAM RUBBER AND PRODUCE.—The net profits of the Malayalam Rubber and Produce Co. for 1918 amounted to £50,973; brought forward, £20,524; the directors recommend the payment of a dividend of 8 per cent. the same (less tax at 5s. 9d. in the pound); to development reserve account, £15,000, against £55,000; forward, £16,182.

MILLOM AND ASKAM SCHEME.—In pursuance of the policy of strengthening and consolidating their resources, adopted by the leading industries of the country, the Millom and Askam directors have formulated a re-organisation scheme. The present capital of the company amounts to £300,000 in equal amounts of 7 per cent. cumulative preference and ordinary shares, and there are 5 per cent. debentures for £132 700. The proposal is to form a new company with a share capital of £2,000,000, of which £1,500,000 will be in ordinary shares and £500,000 in 7 per cent. cumulative preferences, while debentures may be created to the extent of £1,000,000. The new preference shares will carry 9 per cent dividends when the ordinary gets 10 per cent., and the ordinary shareholders will get five new shares for every one held.

PACIFIC PHOSPHATE.—The directors report that during 1918 the war seriously affected the company's business. Complications arose by reason of the fact that the company carried on part of its operations in the German island of Nauru. Nauru now ceases to be a German possession, and it has been decided at the Peace Conference that the mandate for this island shall be given to the British Empire. It is not yet possible to indicate what may be the ultimate effect of this arrangement. The profit for the year (£44,882) was smaller than in 1917. In former years the directors placed £50,000 to a "war contingency reserve," and they have restored half of it (£25,000) to the profit and loss account. It is proposed to pay a dividend on the ordinary shares for the half-year ended December 31, 1918, of 7½ per cent. (making, with the interim dividend, 10 per cent. for the year, against 7½ per cent. for 1917); and to carry forward £13,830, against £20,461 brought in.

ROYAL DUTCH PETROLEUM.—Final dividend for the year 1918 at 25 per cent. (Fls. 250 per share of Fls. 1,000, and Fls. 25 per share of Fls 100), payable on July 16 against the deposit of Coupon No. 44, at the exchange of the day on Amsterdam. A year ago the dividend was 18 per cent.

SELANGOR RIVER RUBBER ESTATES.—At the annual meeting it was stated that the profit earned was £16,857, equal to over 34 per cent. on the company's issued capital, against £39,080 for 1917, equal to 79 per cent. The decrease was due to smaller yield, owing to voluntary restriction of crop in accordance with the scheme of the Rubber Grower's Association, and to the selling price being 1s. 7.73d., the lowest on the company's history. A final dividend was declared of 10 per cent. free of tax, making the dividend for the year 15 per cent.

SERAMBAN RUBBER.—Net profits for 1918 were £41,080, and £21,116 was brought forward; while £607 was recovered in connection with the fire in 1917. A final dividend of 15 per cent. is proposed, making 22½ per cent. for the year; writing £2,000 off plant; adding £2,500 to the reserve; and carrying forward, £13,304.

SUNGEI MATANG RUBBER ESTATE.—The profit for 1918, after allowing for depreciation, was £3,824, against £12,487, to which is added £7,072 brought forward. The sum of £5,599 is placed to taxation reserve account, and the directors propose to pay a dividend for the year at the rate of 5 per cent., and to carry forward £2,466. The crop harvested for the year was 308,033 lb., against an estimate of 330,000 lbs. For 1917 the dividend was 12½ per cent.

VAN DEN BERGH'S NEW CAPITAL.—It is intended to increase the capital of Van den Berghs, Ltd., by £1,000,000, by the issue of 7 per cent. "C" preference shares. This will enlarge the capital of the company to £3,075 000, of which £450,000 is in 6 per cent. cumulative first preference £5 shares, £1,000,000 in 6 per cent. cumulative "B" preference £1 shares, and £625,000 in ordinary £1 shares.

VIRGINIA CAROLINA CHEMICAL.—Messrs. Haes & Sons have received advice of declaration of the ninety-fifth consecutive quarterly dividend of 2 per cent. (2 dols. per share) on preference stock, payable July 15th, and a dividend of 1 dol. per share (1 per cent.), being dividend No. 48 on common stock, payable August 1st; also an extra dividend of 2 dols. per share (2 per cent.), being dividend No. 49 on common stock, payable on October 1st.

AUSTRALIAN COKING AND BY-PRODUCTS.—Capital lost or unrepresented by available assets was the plea in the petition of Australian Coking and By-Products, Ltd., for the confirmation of the court to a reduction of its capital. Mr. Stamp said the company was formed in 1909, with the object of establishing and working coking ovens in Australia. The company could not find a sale for its coke, and the result was that it lost money—at least, £60,000. His Lordship confirmed the reduction.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

LONDON GAZETTE

Liquidators' Notices

RUBBER PROMOTIONS, LTD.—A general meeting will be held at 46 and 47, London Wall, E.C., on Wednesday, August 6, at 11 a.m. C. S. Goddard, Liquidator.

OIL OPTIONS, LTD.—A general meeting will be held at 46 and 47, London Wall, E.C., on Wednesday, August 6, at 10.30 a.m. C. S. Goddard, liquidator.

Bankruptcy Information

HEESCH, ERNEST ERWIN FERDINAND, now carrying on business under the style of the Gatap Company, residing at 59, Clarendon Road, and trading at Stansfield Mill Yard, 77 and 79, Kirkstall Road, Leeds, oxy-acetylene welder and chemical manufacturer. Receiving Order June 30. First meeting July 17, 11 a.m. Official Receiver's Offices, 24, Bold Street, Leeds. Public Examination, Aug. 12, 11 a.m., County Court House, Albion Place, Leeds.

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C. :—

BARKERSHAW CHEMICAL CO., LTD., 52A, Heaton Road Bradford, consulting chemists, chemical engineers and manufacturing chemists. Nominal capital £1,000 in 1,000 shares of £1 each. Directors: To be appointed by subscribers. Qualification of Directors £10. Remuneration of Directors to be voted by Directors.

W. N. MONKS & CO., LTD., 38, Silverwell Lane, Bolton, Lancaster. chemists, druggists, drysalters, &c. Nominal capital £5,000 in 5,000 shares of £1 each. Directors: A. A. Halt, 611, Chorley Old Road, Bolton; A. W. S. Monks, 603, Chorley Old Road, Bolton; W. N. Monks, 665, Chorley Old Road, Bolton. Qualification of Directors, £100. Remuneration of Directors to be voted by company in general meeting.

ALFRED SMITH, LTD., manufacturing chemists. Nominal capital, £80,000 in 50,000 ordinary shares and 30,000 Six per Cent. cumulative preference shares of £1 each. Directors: A. Smith, W. Smith, E. Smith, Excelsior Works, Bank Street, Clayton, Manchester. Qualification of Directors, £2,000. Remuneration of Directors to be voted by Directors.

B. BIGGS & CO., LTD., Blondin Works, Blondin Street, Old Ford, E., makers of methylated spirits, rectifiers and distillers, manufacturers and dealers in all kinds of methylated polishes, spirit and oil varnishes, &c. Directors: F. C. Hawkins, Eccentric Club, St. James, S.W.; T. Hoare, 17, Cornwall Terrace, Regent's Park, N.W. 1. Nominal capital, £20,000 in 20,000 shares of £1 each. Qualification of Directors, 1 share. Remuneration of Directors to be voted by company in general meeting. Subscriber: W. R. Honeywill, Kingswood, Chislewood, Kent, 50 shares.

EDIBLE FATS (BLACKBURN), LTD., Whalley Banks, Mills, Blackburn, Lancaster, dealers in and refiners of tallow and edible fats. Nominal capital £3,000 in 2,998 ordinary shares of £1, and 25 of preference shares of £1. Directors: G. Smith, 12, Hamilton Place, Blackburn; H. Ryden, Neven Wiltshire, near Blackburn. Qualification of Directors, 1 share. Remuneration of Directors to be voted by company in general meeting.

UNITED IMPORT AND EXPORT COMPANY, LTD., importers and exporters of chemicals, &c. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors: W. C. Derre, 9, Belsize Grove, N.W. 3; H. J. Collingwood, 17, Sloane Street, S.W. Qualification of Directors, £200. Remuneration of Directors to be voted by company in general meeting.

E. NICKERSON & CO., LTD., Royal Docks Chambers, Great Grimsby, chemical merchants, importers and exporters, &c. Nominal capital, £10,000 in 10,000 shares of £1 each. Directors: E. Nickerson, Cleethorpe Road, Grimsby; E. W. Nickerson, "Woodlands," Manby; C. A. Peck, Park Drive, Manby. Qualification of Directors, £1,000. Remuneration of Directors, to be voted by company in general meeting.

BALTIMORE POTTERY COMPANY, LTD., Baltimore Works, Albion Street, Longton, Staffs. Nominal capital, £4,000 in 4,000 shares of £1 each. Directors: A. Goldberg, E. Tams, F. Hughes, J. Bond. Qualification of Directors, £100. Remuneration of Directors to be voted by company in general meeting.

STRAFFON & CO., LTD., oil and colour merchants. Nominal capital, £2,000 in 2,000 shares of £1 each. Directors: Ann Straffon, Oak Villa, Beckton Road, East Ham, E. 12. Qualification of Directors, 1 share. Remuneration of Directors to be voted by company in general meeting.

JAMES RUDMAN, LTD., Cambrian Colour Works, River Street, Bristol, varnish, paint and glue manufacturers and merchants. Nominal capital £30,000 in 6,000 cumulative preference shares of £1 and 20,000 ordinary shares of £1. Director: H. J. G. Rudman, Failand Lodge, Guthrie Road, Clifton, Bristol. Qualification of Directors, £50 ordinary shares. Remuneration of Directors to be voted by company in general meeting.

LAFTINE, LTD., 41, St. Paul's Street, Leeds, manufacturers and merchants and dealers in soaps, &c. Nominal capital, £15,000 in 15,000 shares of £1 each. Directors: L. Shaw, 98, Caledonian Road, Leeds; M. B. V. Dewar, Bridge House, Harewood, Leeds. Qualification of Directors, £500. Remuneration of Directors to be voted by general meeting.

J. H. RAVEN, LTD., tanners, curriers, leather dressers, &c. Nominal capital £50,000 in £1 shares. Director: J. H. Raven, 4, St. Albans Road, Leicester. Qualification of Directors, £10,000 per Director. Others £250. Remuneration of Directors to be voted by Company in general meeting.

Potash Manufacturing Plant.

MR. POLLOCK, High Court Official Referee, on Tuesday gave judgment in an action in which Messrs. Willcocks & Co., builders and contractors, of Wolverhampton, claimed for work done £5,656 3s. from the British Potash Co., Ltd., in connection with their factory at Oldbury, near Birmingham.

Mr. Joy, the plaintiffs' counsel, in stating their case, said that the defendants, who were engaged in the manufacture of potash for the Government, employed the plaintiffs under a contract to construct at their Oldbury factory eight vats at the price of £375 10s., the flooring under at a cost of £565 5s., to provide one tank at the price of £1,630 5s. and to erect a chimney stack for £404. It was agreed that any increase in the cost of labour and materials consequent upon the war was to be adopted in fixing the prices ultimately to be paid. While the work was in progress it was agreed that the chimney stack should be omitted, and that there should be four vats only instead of eight.

The defendants, in paying £3,500 into Court as sufficient to cover the work done, pleaded contract. The plaintiffs' answer to that was that the conditions were such that it would be improper to attempt to hold the plaintiffs to the terms of the original estimate, because it had been departed from in spirit and in detail. Then they said that the work was carried on upon the footing that it was to be paid for at what it cost. Moreover, said counsel, a review of the situation took place, the drift of which was that defendants agreed that plaintiffs should be paid for what they did at what it cost. The plaintiffs asserted that they had done the work as directed and had only charged in accordance with that arrangement. Having carried out the original bargain, with the exception of those items which were struck out, the plaintiffs said they were entitled to what the work cost them. What they really did and what they were asked to do in the first instance were quite different and therefore they claimed that the original estimate ought to be disregarded.

A great deal of evidence was given on both sides and in the result,

The Official Referee found that the £3,500 paid into Court was amply sufficient to cover the work and any extras which might be allowed, and there would therefore, he said, be judgment for the defendants, who would have to pay the costs up to the time of the payment into Court, after which the costs would have to be borne by the plaintiffs.

Judgment was entered for the defendants accordingly.

Synthetic Coal Syndicate

In the Company's Winding-Up Court of the Chancery Division on Tuesday, before Mr. Justice P. O. Lawrence, the petition of Messrs. Vickery, Hunt & Co., for the compulsory winding up of Synthetic Coal Syndicate, Ltd., was dismissed. Mr. Owen Thompson, K.C., said all the creditors of the company, including the petitioners, had been paid, and the costs of the petition provided for. He, therefore, asked leave to withdraw the petition.

For Sale or Wanted.

(Three lines, 3s.; each additional line, 1s.)

DIATOMITE - KIESELGUHR. Advertisers carry stocks of White, Grey and Pink qualities, and invite inquiries from buyers to Box No. 8, CHEMICAL AGE Offices, 8, Bouverie Street, E.C.4.

WANTED at once 100 kg. Pepsin, T.100, and 1000 kg. green powdered Gall (Bile). Send samples and price, post paid—middle men not wanted—1, Rue Gabrielle, Paris, France.

Situations Wanted.

(Twenty-seven words, 2s.; every additional nine words, 6d.)

CHEMIST (25), Danish, M.T.C.E., (Cophg.) B.Sc., in chemical Engineering, with 5½ years training in Analytic and Synthetic Chemistry, wants occupation in factory or laboratory. Box No. 7, CHEMICAL AGE Offices, 8, Bouverie, Street, E.C.4.